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no.3
v.6

U. S. DEPARTMENT OF THE INTERIOR
PROTOTYPE OIL SHALE LEASING PROGRAM

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TRACT C-b

QUARTERLY REPORT #3

(Through May 31, 1975)

Submitted to:

Mr. Peter A. Rutledge
Area Oil Shale Supervisor
Conservation District
U. S. Geological Survey
Grand Junction, Colorado

By:

Ashland Oil, Inc.
Atlantic Richfield Company
Shell Oil Company, Operator
The Oil Shale Corporation

JULY 15, 1975

SHOUT
SHARE
IT

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Geophysical Logs

II B-11 GEOPHYSICAL LOG DATA

The geophysical logs submitted in Quarterly Report #3 essentially complete the package of logs on the vertical holes drilled to date. Logs from the inclined hole drilling are not yet available, and it is possible that some future vertical drilling in preparation for the sinking of mine shafts may produce additional geophysical logs. As discussed in previous quarterly reports, our logging program includes several types of logs not specifically required by the Lessor. Specifically the cement bond log, perforation information logs and collar log, provide information related to well completion. The purpose and description of the other types of logs used can be found in previous quarterly reports.

The following table summarizes the logs presented herein.

TABLE II B-58
GEOPHYSICAL LOGS
IN
QUARTERLY REPORT 3

	AT-1B	AT-1C	AT-1D	CB-1	CB-2	CB-4	SG-1	SG-1A	SG-6	SG-9	SG-11	SG-17
Cement Bond Log	X	X	X	X	X	X	X			X	X	X
Perf Record & Collar log	X	X	X	X		X	X		X		X	X
Perf Depth log				X			X			X		X
Open Hole Amplitude & Volume								X				
Borehole Comp. Sonic		X						X	X			
Laterolog		X						X	X			
Neutron Formation Density		X						X	X			
Temperature		X						X	X			

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CEMENT BOND LOG

GR-VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION
WELL AT-1B
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL AT-1B

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.

Sec. 7 Twp. 3S Rge. 96W

Other Services:
ORP-HD
BP-B

Permanent Datum: GROUND LEVEL, Elev. 6909
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6909

Date	9-12-74	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	235
Depth — Driller	1632 & 1456	Max. Rec. Temp.	90 °F
Depth — Logger	1631 & 1464	Est. Cement Top	1222
Btm. Log Interval	1623 & 1456	Equip. | Location	3862 | VERNAL
Top Log Interval	1100 & 1100	Recorded By	MARTIN/ST.AUBYN
Open Hole Size	7 7/8"	Witnessed By	MR. ROSS

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8	-		T & C	0	60
Prot. String (1)	2 3/8	4.7		T & C	0	1632
Prod. String (2)	2 3/8	4.7		T & C	0	1456
Liner STRING (3)	2 3/8	4.7		T & C	0	1217

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			220 SKS	
Type of cement			CLASS "G"	
Additive			.6 GEL	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE

The well name, location and borehole reference data were furnished by the Customer.

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement	13:00 7-22-74	
Release pressure	15:00 9-12-74	
Start Cement Bond Log	17:00 9-12-74	
Finish Cement Bond Log		

Preceding fluid ______ Volume ______ bbls.

Cement pumped ______ bbls./minute

Pipe reciprocated during Pumping: Yes ____ No ____

Pipe reciprocated after plug down: Yes ____ min., No ____

REMARKS

Service Order No. 9733.1

Csg. Collars Recorded 19ft. DEEP

SQUEEZE JOB DETAIL

Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

AVERAGE WELL DRIFT:
from ____ to ____ ; from ____ to ____ ; from ____ to ____

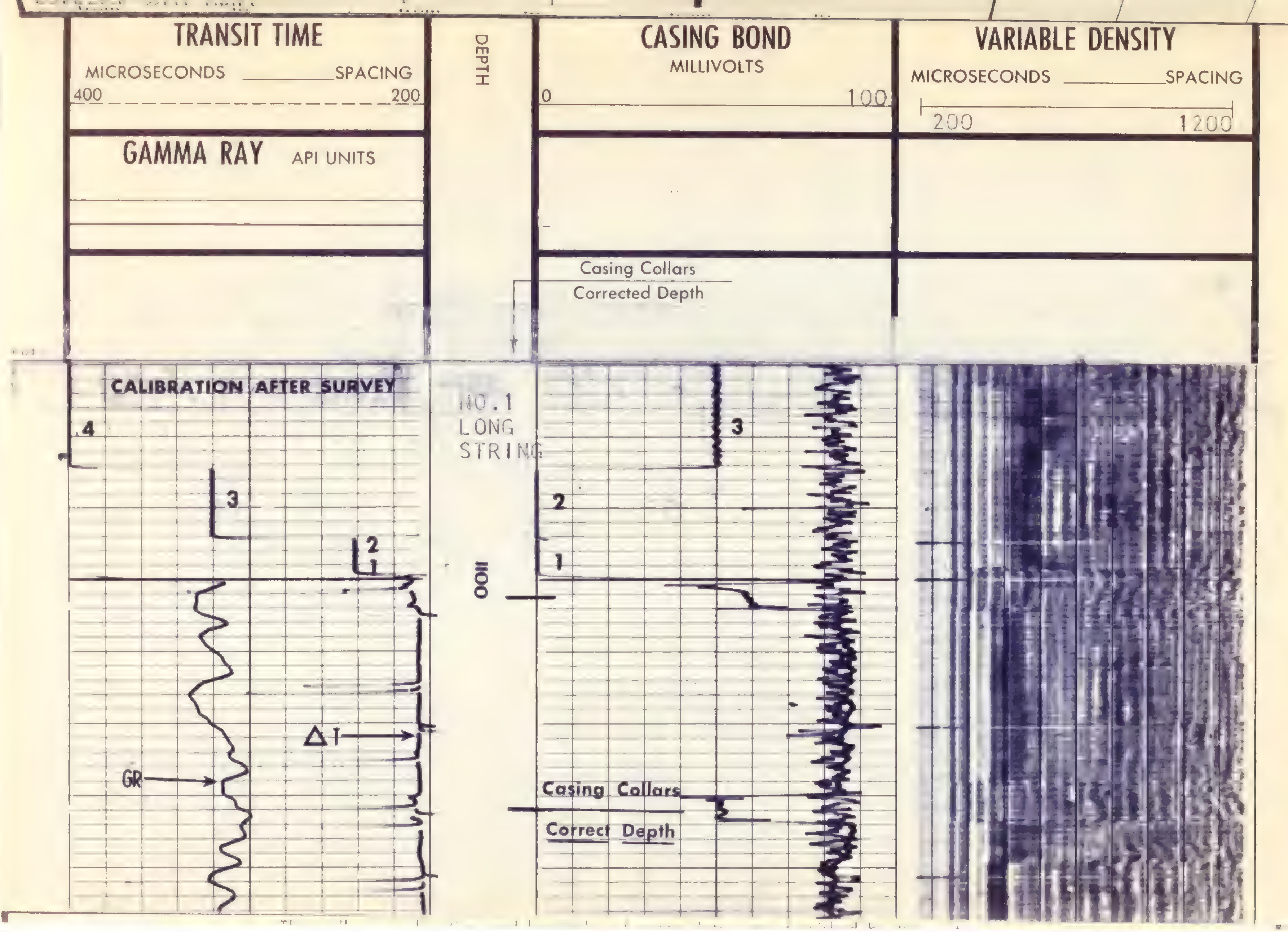
EQUIPMENT DATA

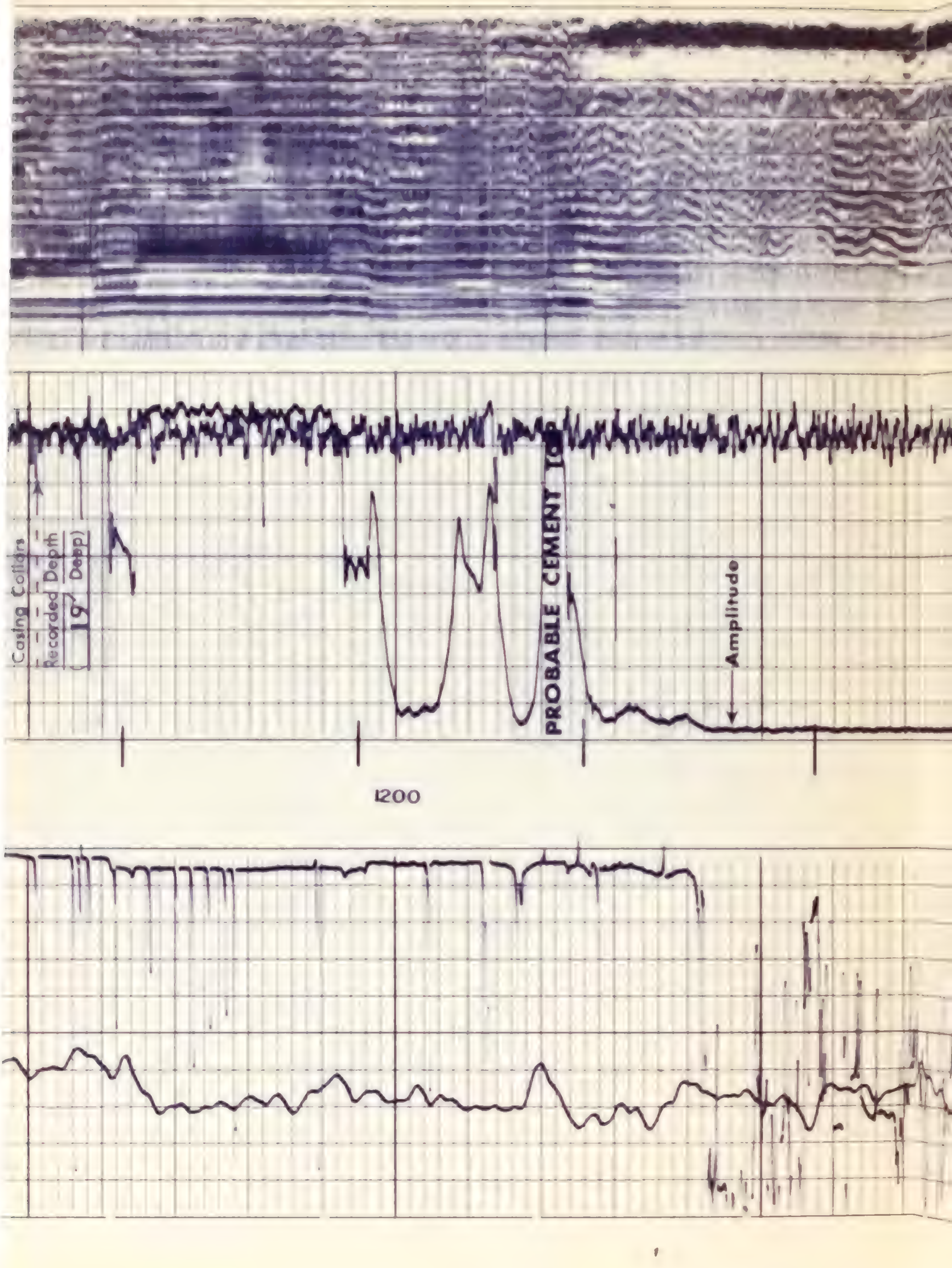
EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SLP-E[illegible]	
Sonic Cart No.	SHI-AA A#45	
Sonic Sonde No.	SLS-JC#31	
CRP No.	1	
Mem Panel No.	MMP-D#201	
GR Panel No.	SNP-D-55E	
GR Cart No.	SHI-AFA#11	
Centralizer: Type	CAL-A-CYE-V	
No.	CYE-M	
To Level (MV)	125	
Cart. Gain	1.25	
CRP Intensity	.15	
R9G Intensity	1.5	
Logging Speed	30 FPM	
Time Constant	TWO	

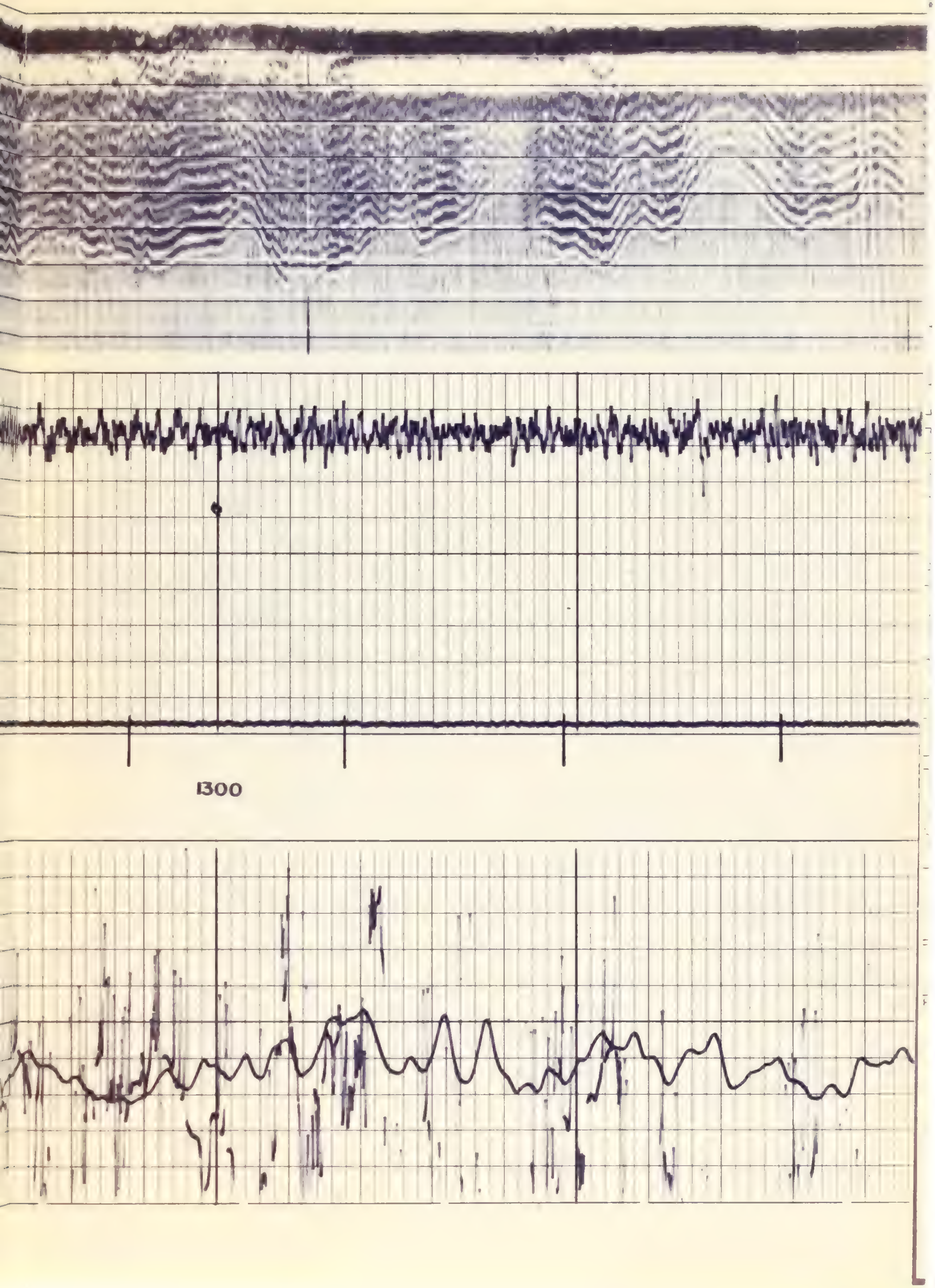
TRANSIT TIME

CASING BOND

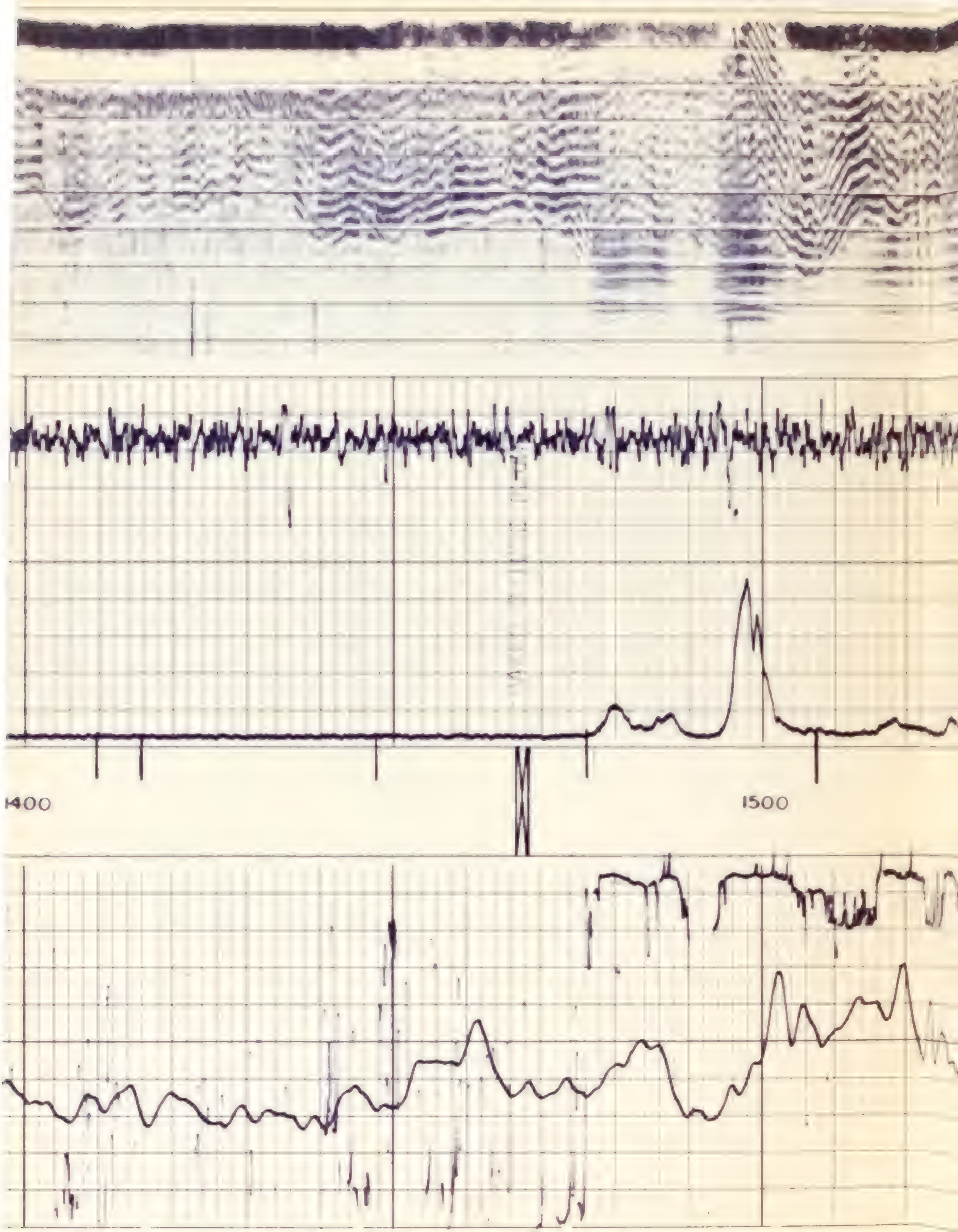
VARIABLE DENSITY

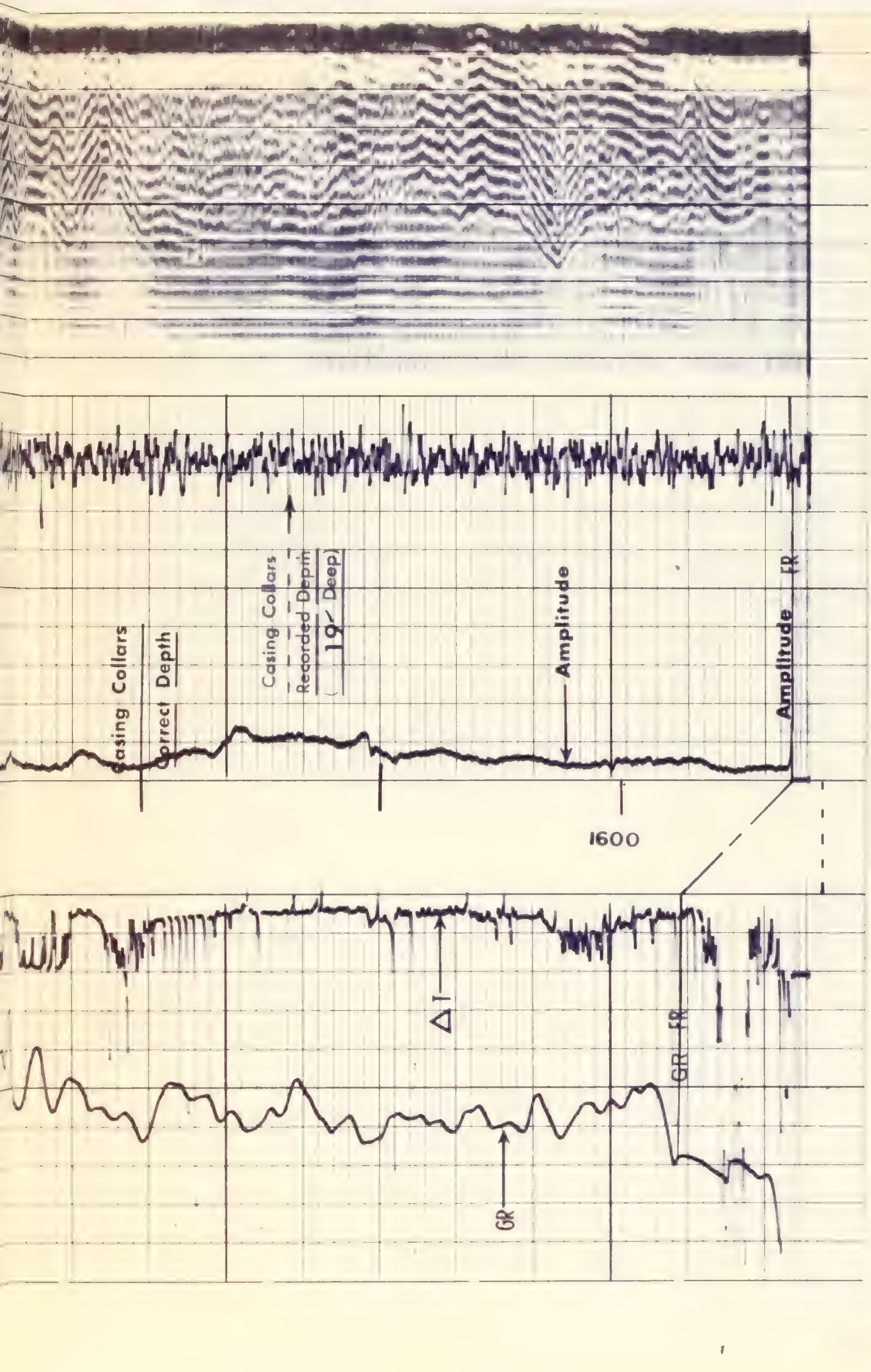

TRANSIT TIME
MICROSECONDS
SPACING
400
200
GAMMA RAY
API UNITS
DEPTH
CASING BOND
MILLIVOLTS
0
100
VARIABLE DENSITY
MICROSECONDS
SPACING
200
1200
Casing Collars
Corrected Depth
CALIBRATION AFTER SURVEY
4
3
2
1
NO.1
LONG
STRING
1100
3
2
1
ΔT
GR
Casing Collars
Correct Depth

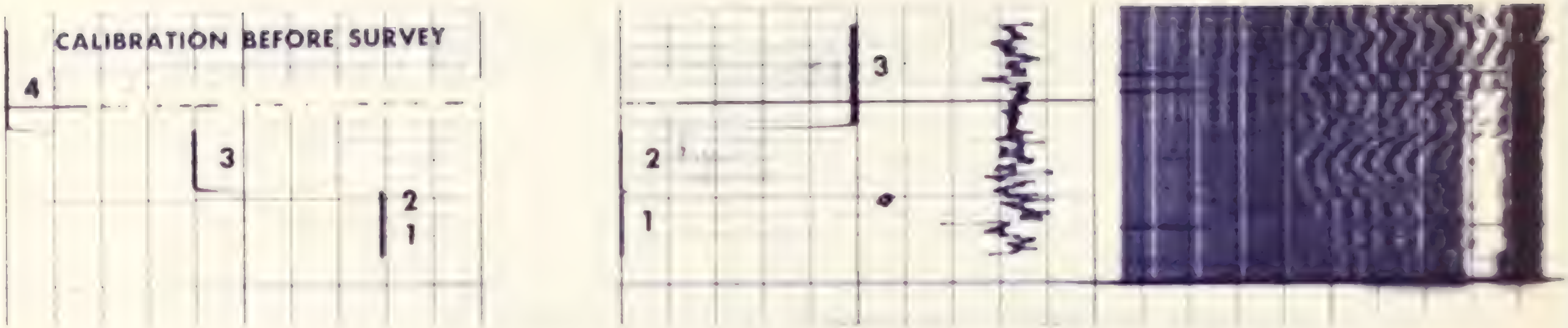

Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
Amplitude
1200

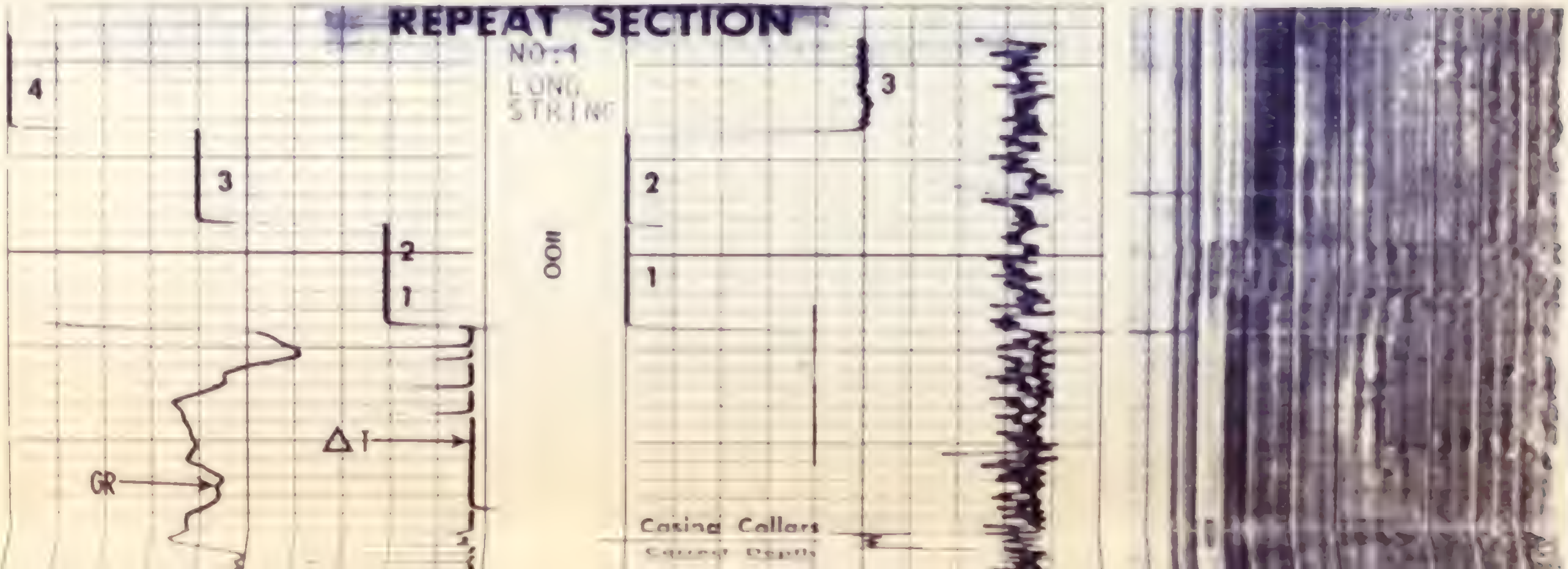


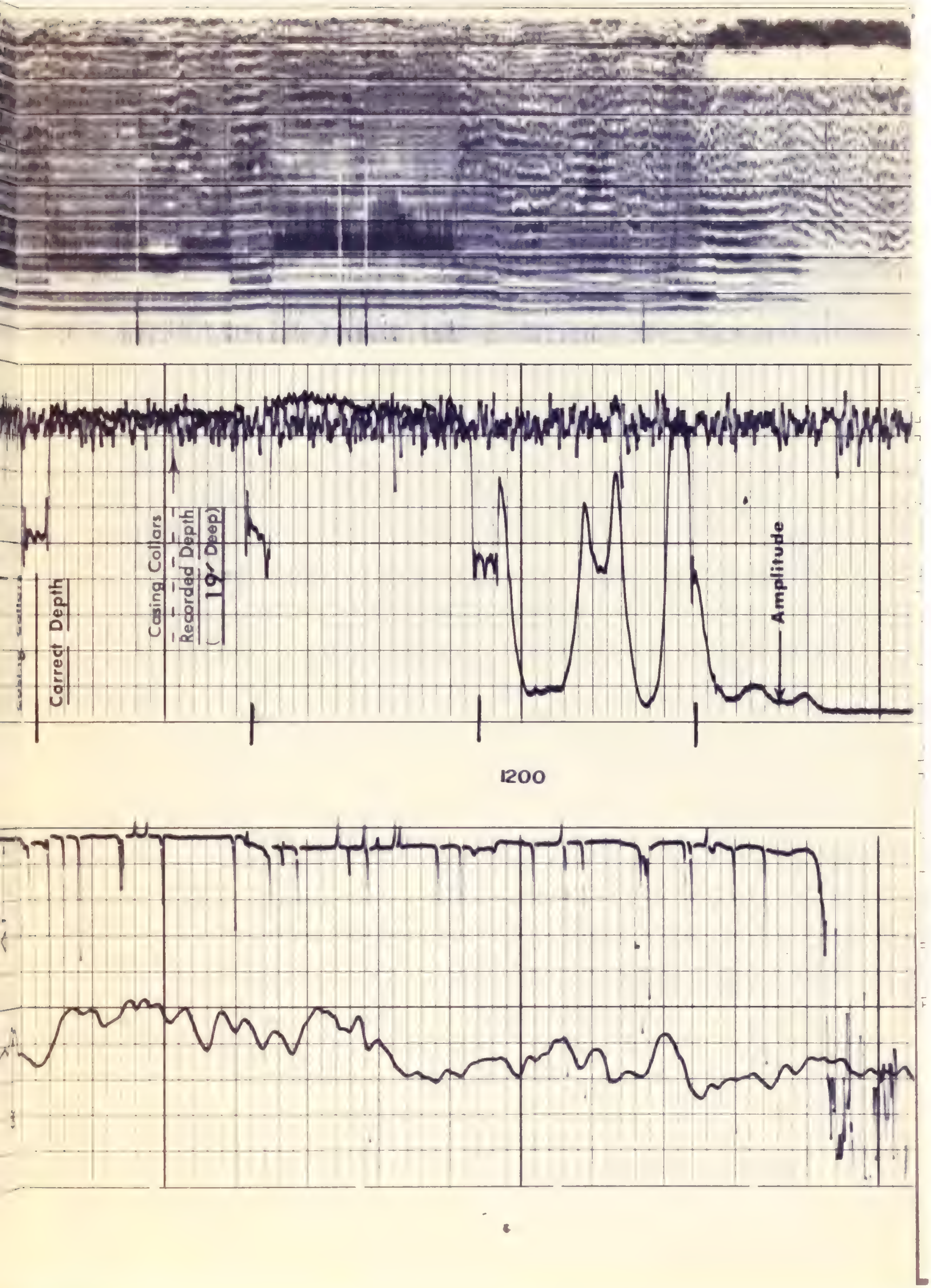
1300

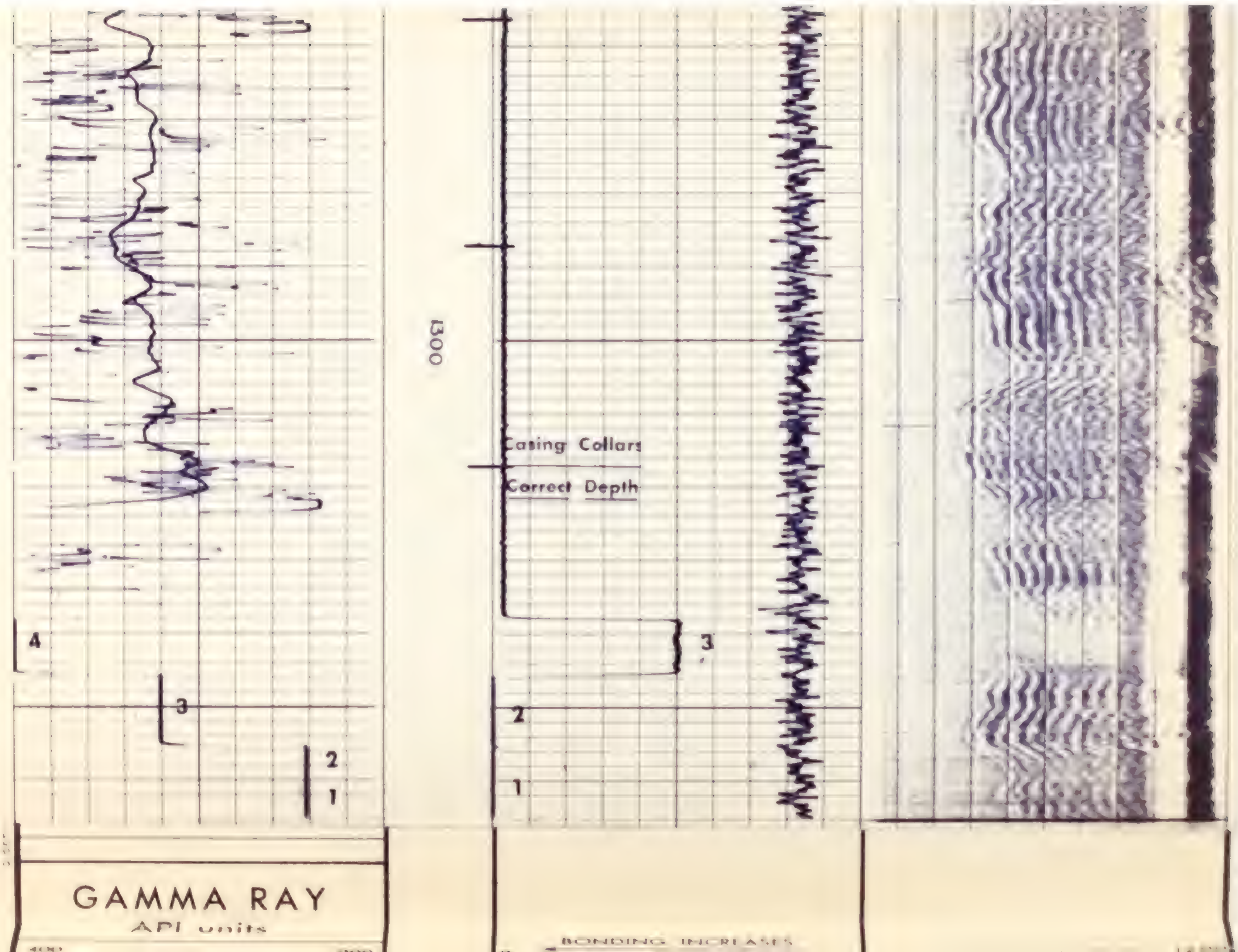

1400
1500

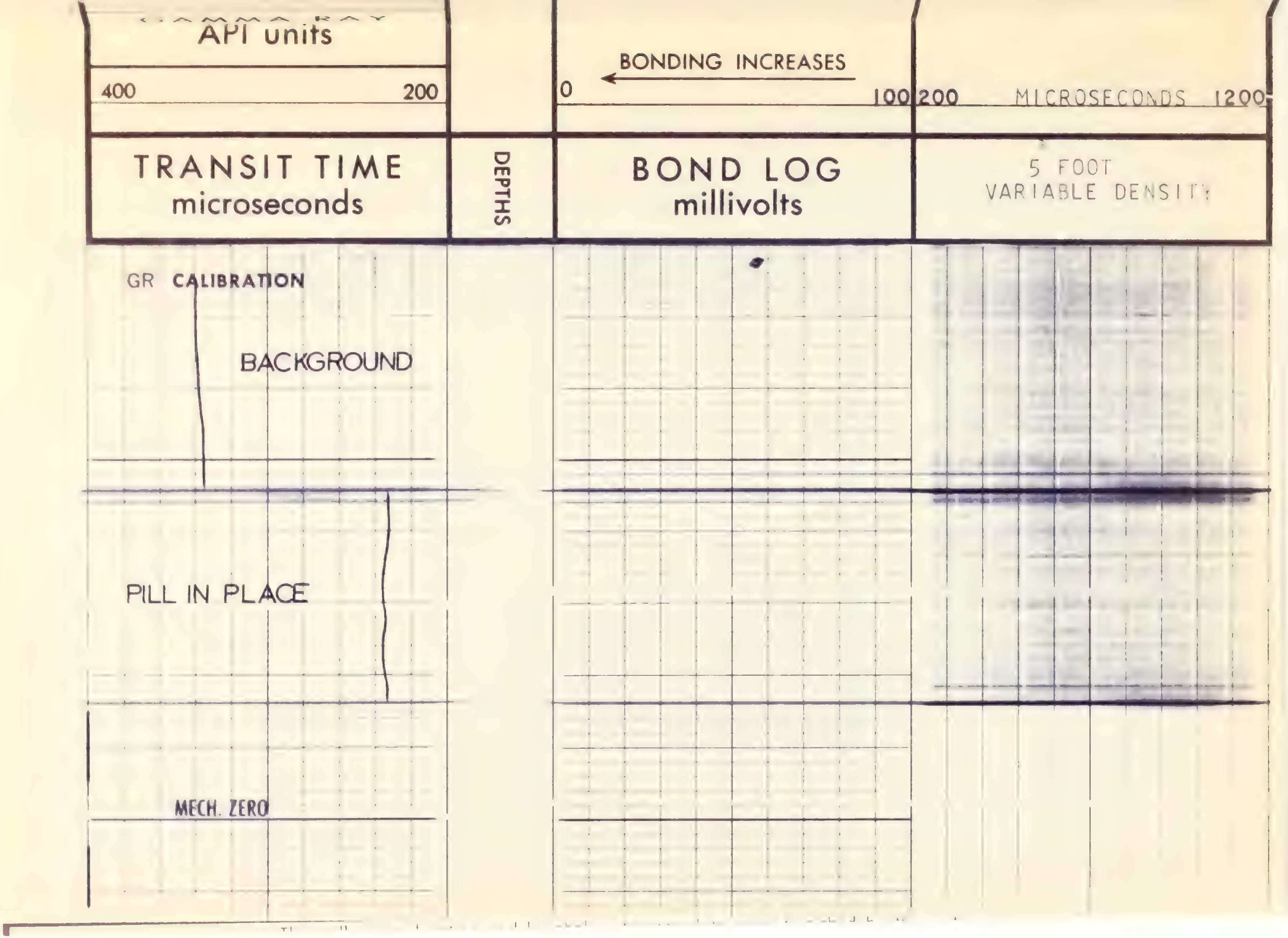

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
Amplitude
FR
1600
ΔT
GR
GR FR

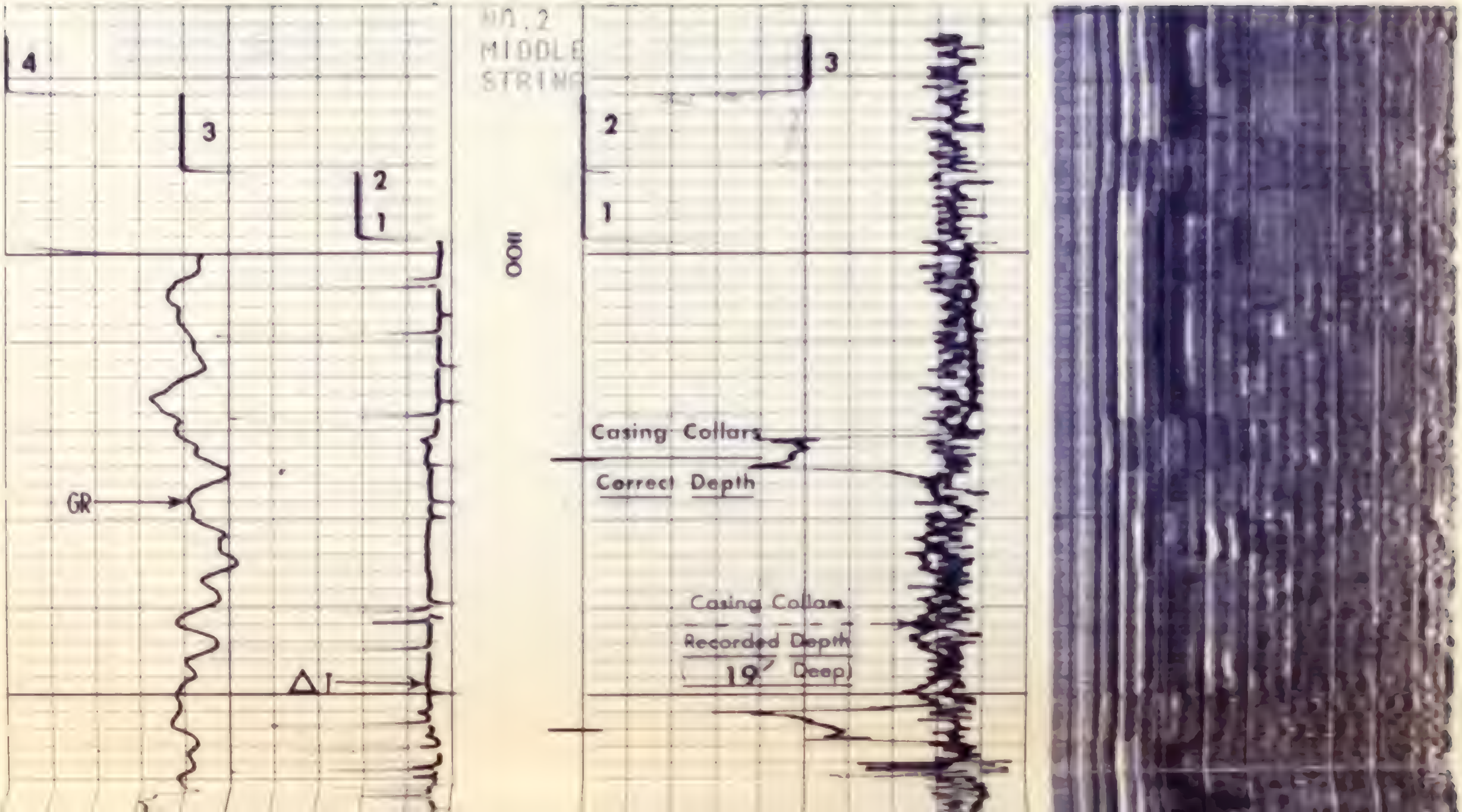

CALIBRATION BEFORE SURVEY
4
3
2
1
3
2
1

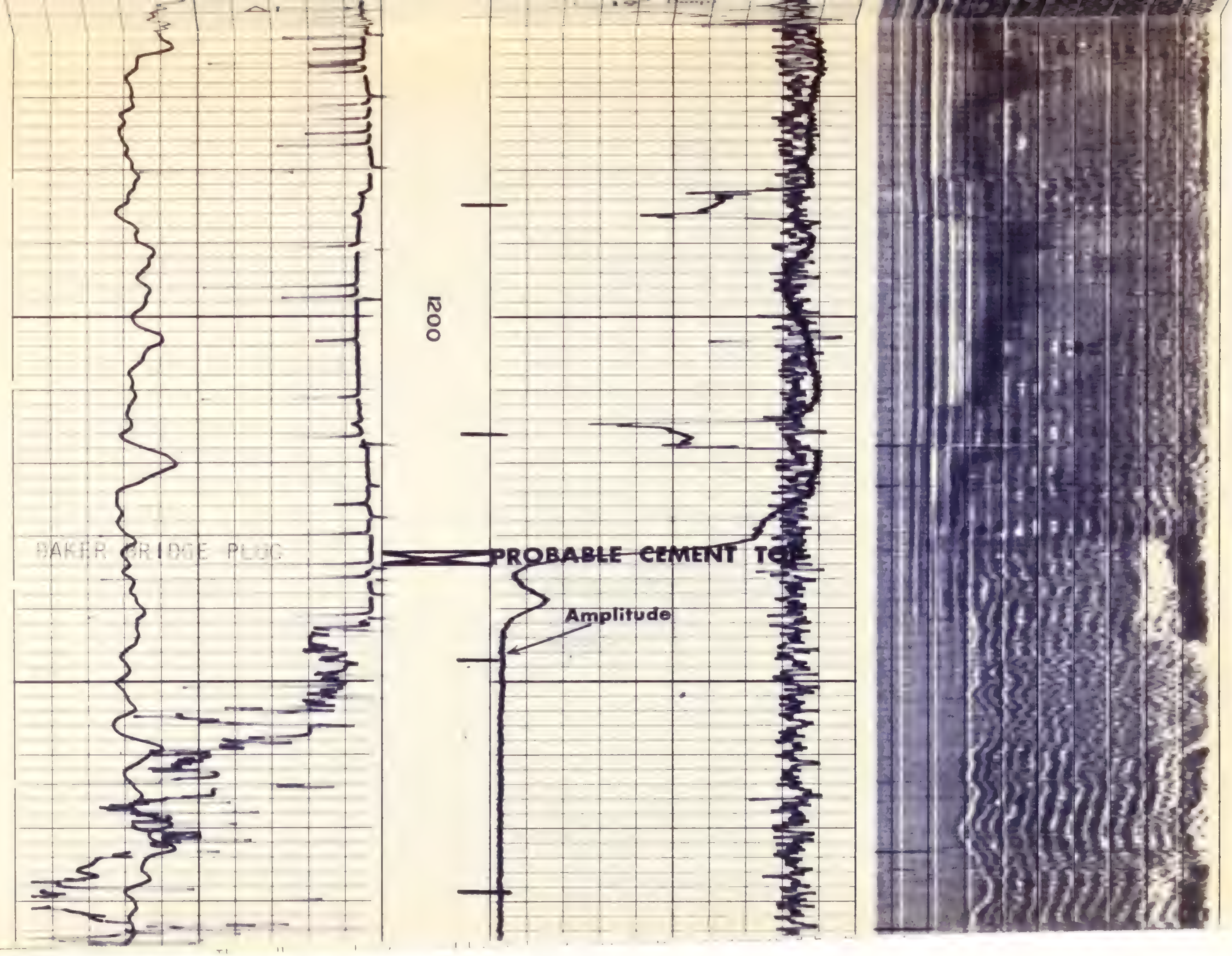

REPEAT SECTION
NO. 1
LONG
STRING
4
3
2
1
1100
3
2
1
ΔT
GR
Casing Collars
Correct Depth

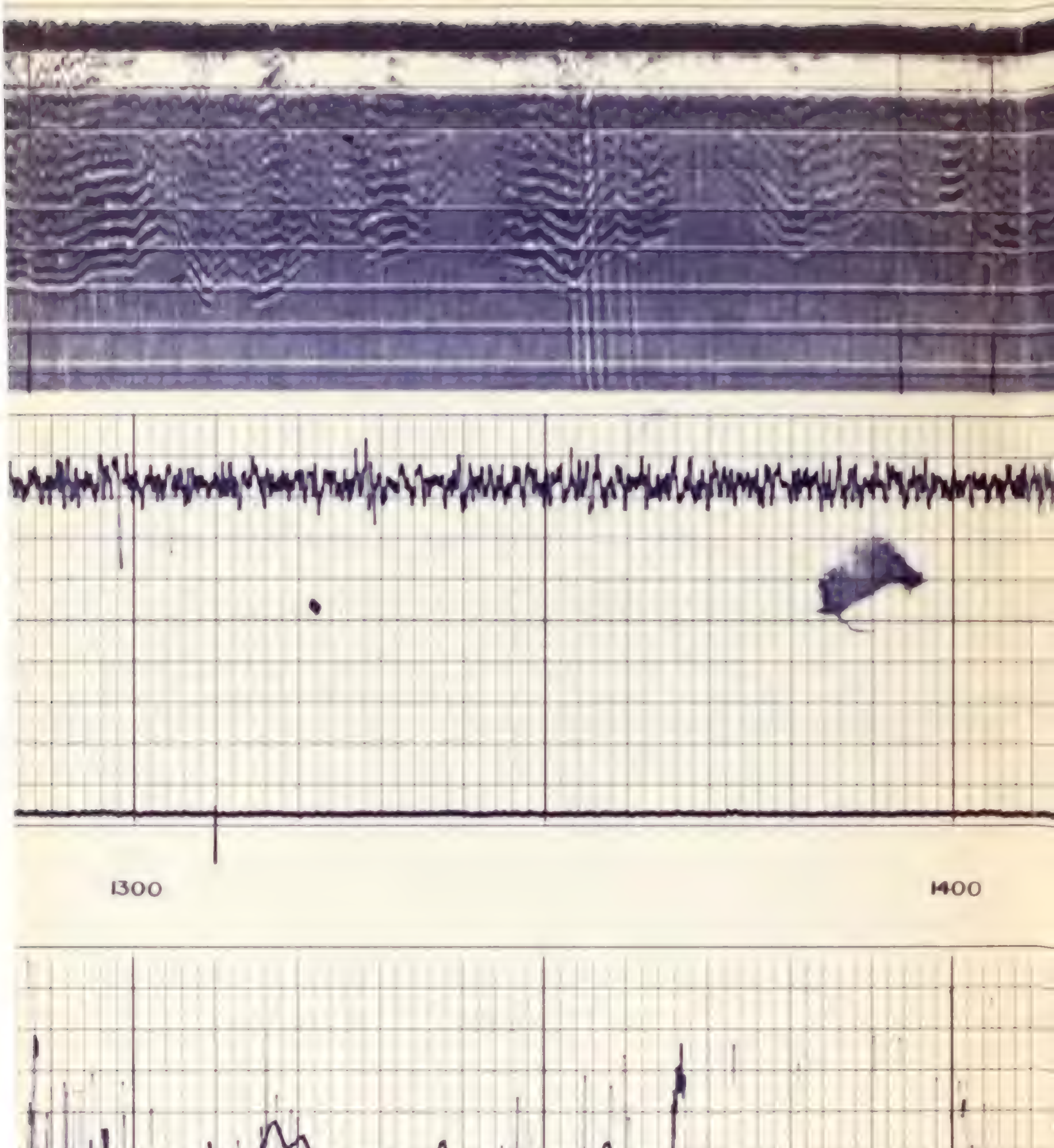

Tubing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
1200

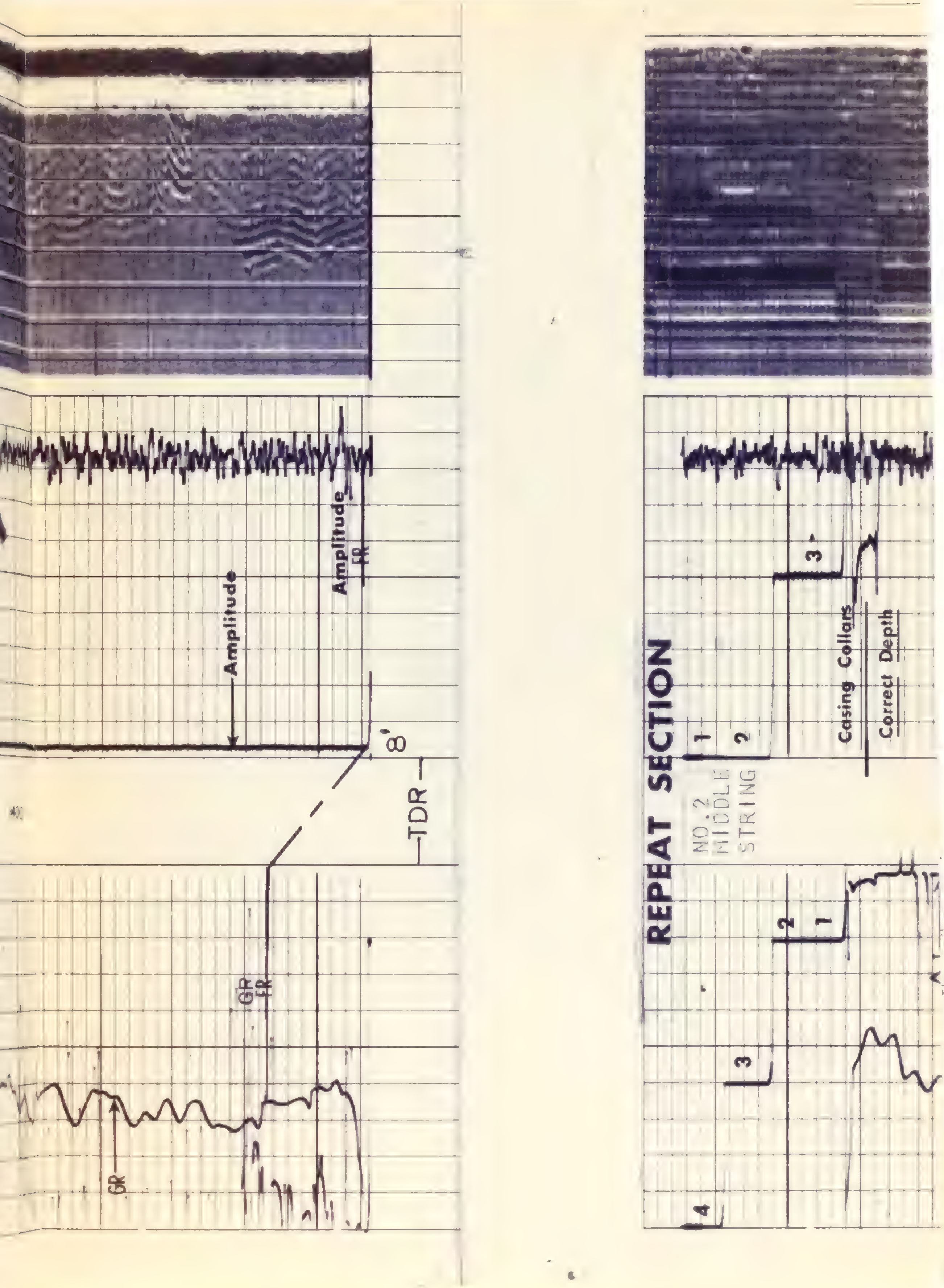

1300
Casing Collars
Correct Depth
3
2
1
4
3
2
1
GAMMA RAY
API units
BONDING INCREASES

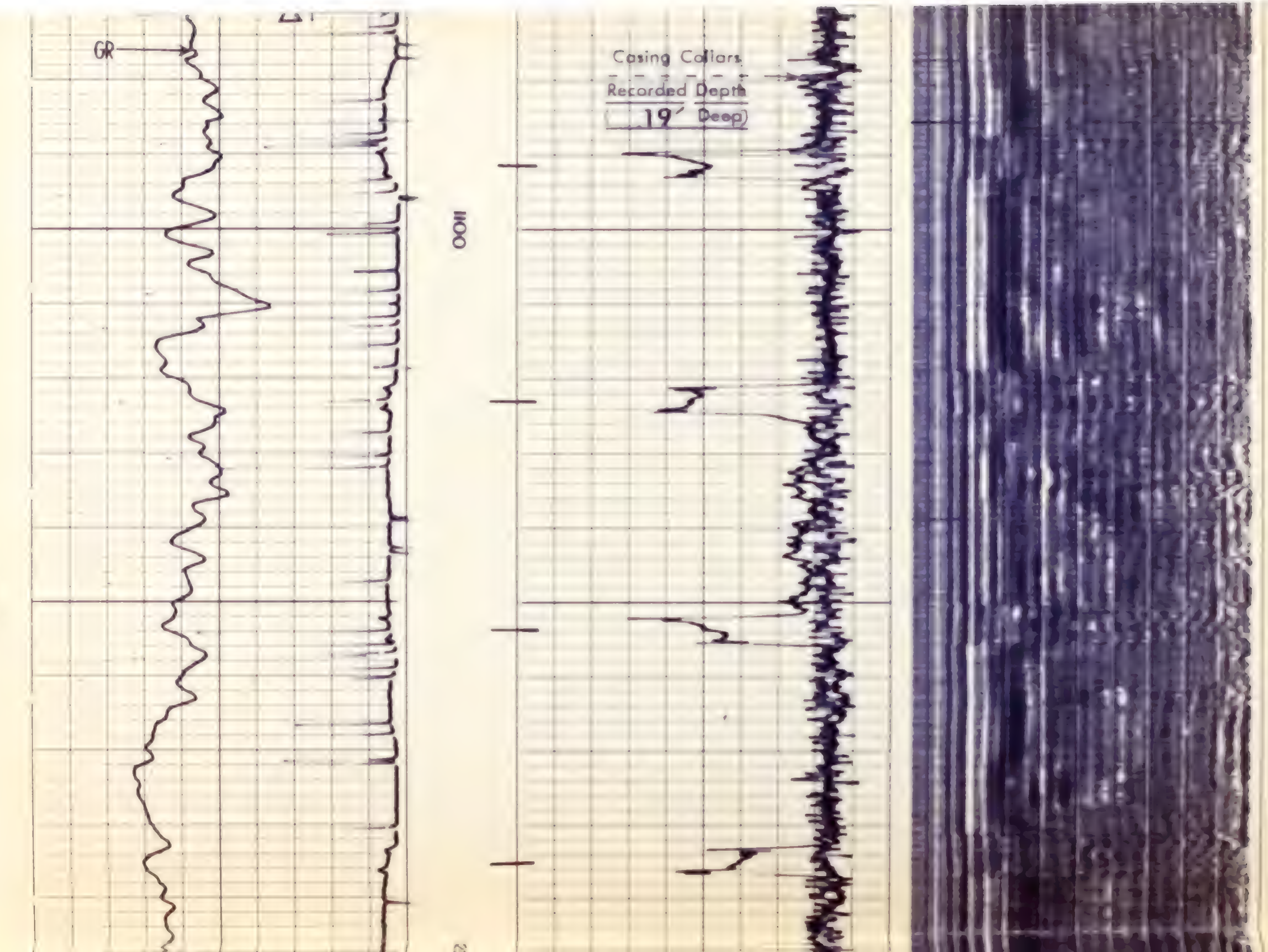

API units
400
200
TRANSIT TIME
microseconds
DEPTHS
BONDING INCREASES
0
100
BOND LOG
millivolts
200
MICROSECONDS
1200
5 FOOT
VARIABLE DENSITY
GR CALIBRATION
BACKGROUND
PILL IN PLACE
MECH. ZERO

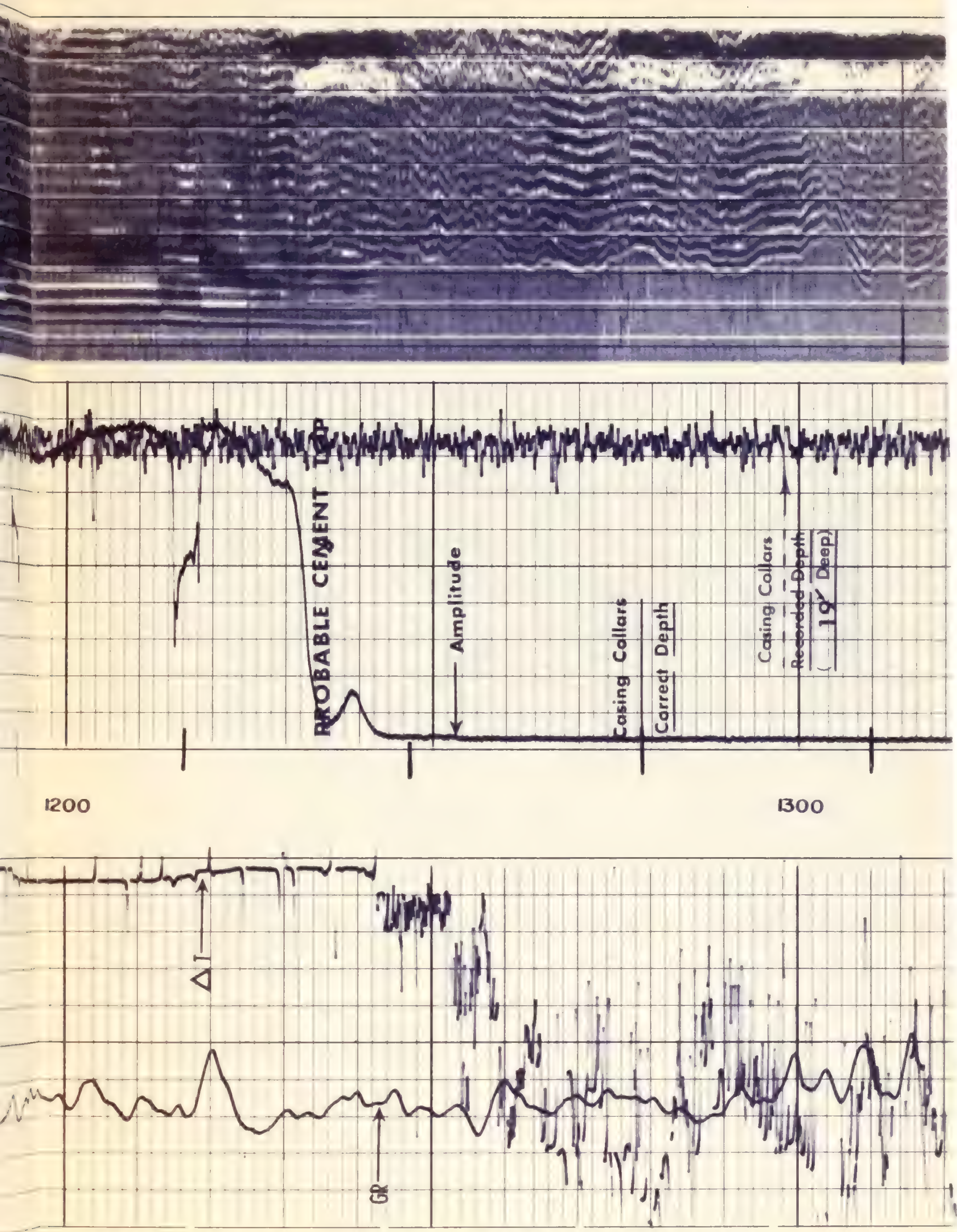

NO. 2
MIDDLE
STRING
4
3
2
1
3
2
1
1100
GR
ΔT
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)

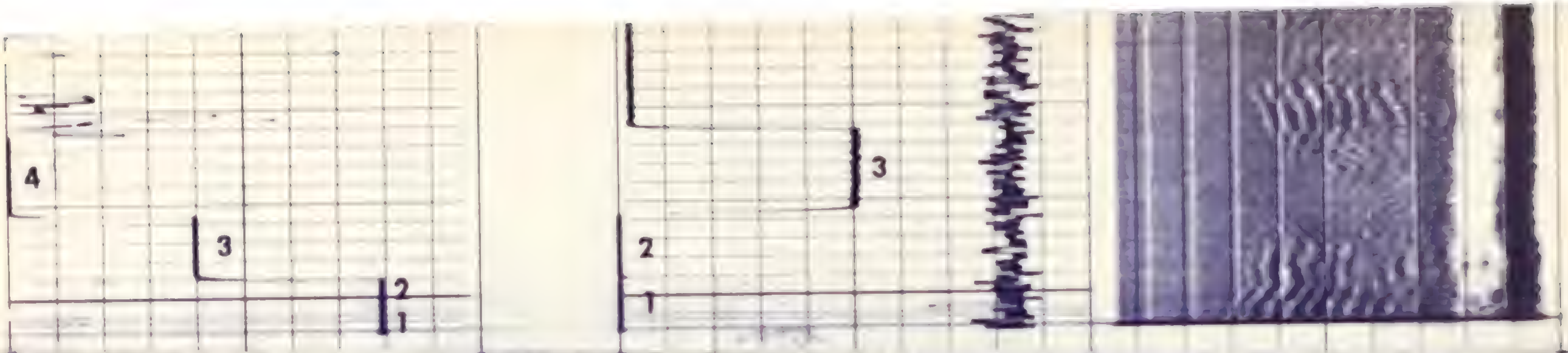

1200
BAKER BRIDGE PLUG
PROBABLE CEMENT TOP
Amplitude


1300
1400


Amplitude
Amplitude FR
8'
TDR
GR FR
GR
REPEAT SECTION
NO. 2 MIDDLE STRING
1
2
3
4
Casing Collars
Correct Depth


GR
Casing Collars
Recorded Depth
19' Deep
1100


PROBABLE CEMENT TOP
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
1200
1300
ΔT
GR



Casing Collars
Corrected Depth

TRANSIT TIME
MICROSECONDS ________ SPACING
400 — 200

GAMMA RAY API UNITS

DEPTH

CASING BOND
MILLIVOLTS
0 — 100

VARIABLE DENSITY
MICROSECONDS [illegible] SPACING
[illegible]

COMPANY ATLANTIC RICHFIELD COMPANY
WELL AT-1B
FIELD
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1623 & 1456
SCHL. TD 1631 & 1464
DRLR TD 1632 & 1456
Elev:
KB ----
DF ----
GL 6309

CEMENT BOND CALIBRATION CODING

	ΔT	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

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ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY
FIELD or LOCATION
WELL
COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL A[illegible]-1[illegible]

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location:

Sec. Twp. [illegible] Rge. [illegible]

Other Services:
[illegible]
[illegible]
[illegible]P

Permanent Datum: [illegible] ; Elev.: [illegible]
Log Measured From [illegible] , [illegible] Ft. Above Perm. Datum
Drilling Measured From [illegible]

Elev.: K.B. ----
D.F. ----
G.L. [illegible]

Date	11-[illegible], 1[illegible], 11-[illegible]
Run No.	ONE
Pipe String No.	ONE-TWO-THREE
Pipe String Ident.	[illegible]
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	[illegible]
Density	[illegible]
Level	FULL
Max rec. temp., deg F.	[illegible]
Operating rig time	
Recorded by	[illegible]. AU[illegible]
Witnessed by	[illegible]. [illegible]URNS

BORE-HOLE RECORD

Bit	From	To
	[illegible]	[illegible]

CEMENTING RECORD

	Type	Wgt.	From	To
Primary	[illegible] [illegible]		1[illegible]	1[illegible]
Squeeze				

EQUIPMENT DATA

Hoist Truck No.		Rotator Size	
Inst. Truck No.		Rotator No.	
Tool Serial No.		Indexer Type	
Location		Indexer No.	

DEPTHS RELATE TO

Radioactivity Measurements ☐
Schlumberger Line Measurements ☐

CASING COLLARS

PERFORATING DATA / LOGGING DATA

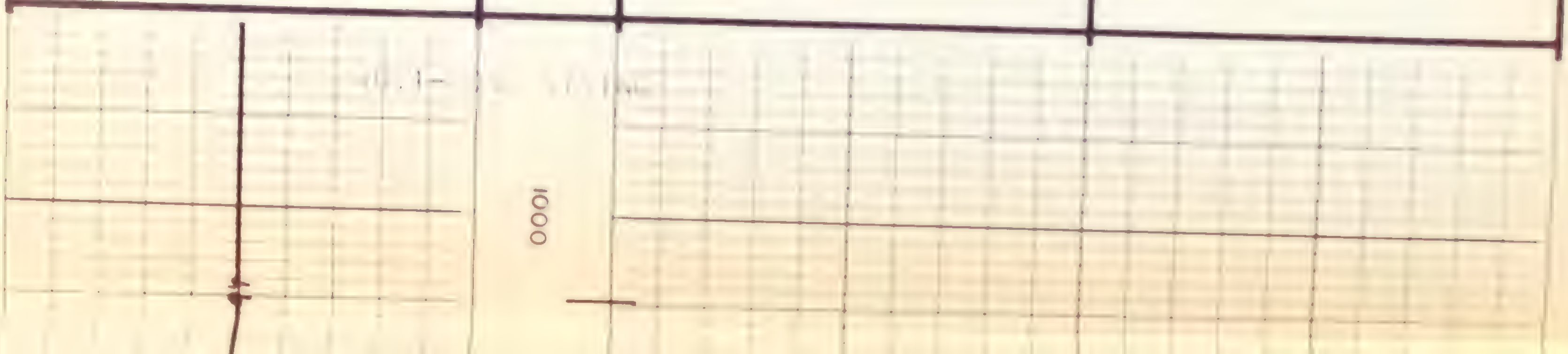
Depths From	Depths To	No Shots	Gun Size	Gun Type	Time Const	Sens Setting	Zero Shift	Calib Sens.	Calib. Defl

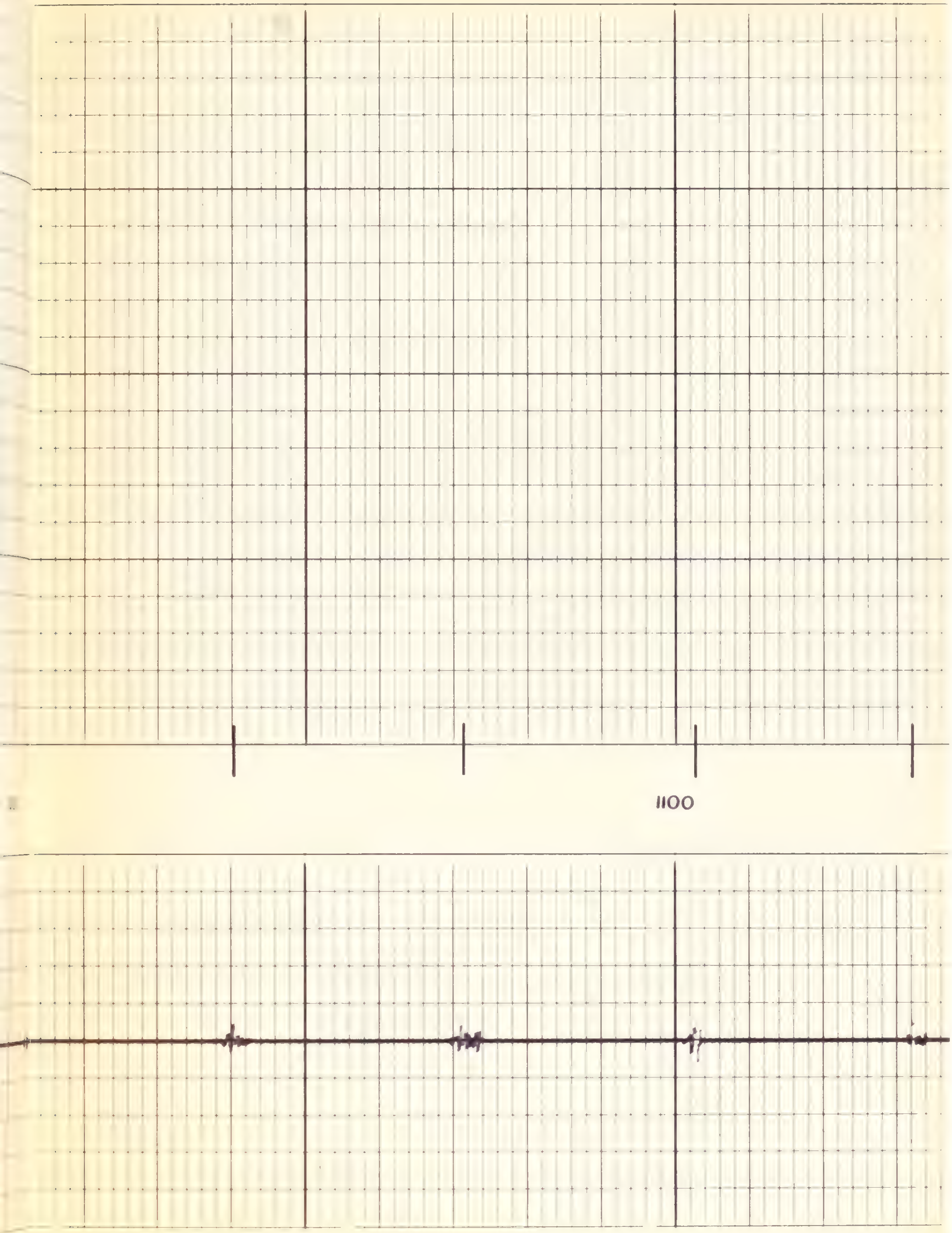
PIPE STRING RECORD

Number	1	2	3	4
Identification				
Size				
Weight				
Depth				

Remarks:

CASING COLLAR LOG BEFORE PERFORATION	DEPTHS		

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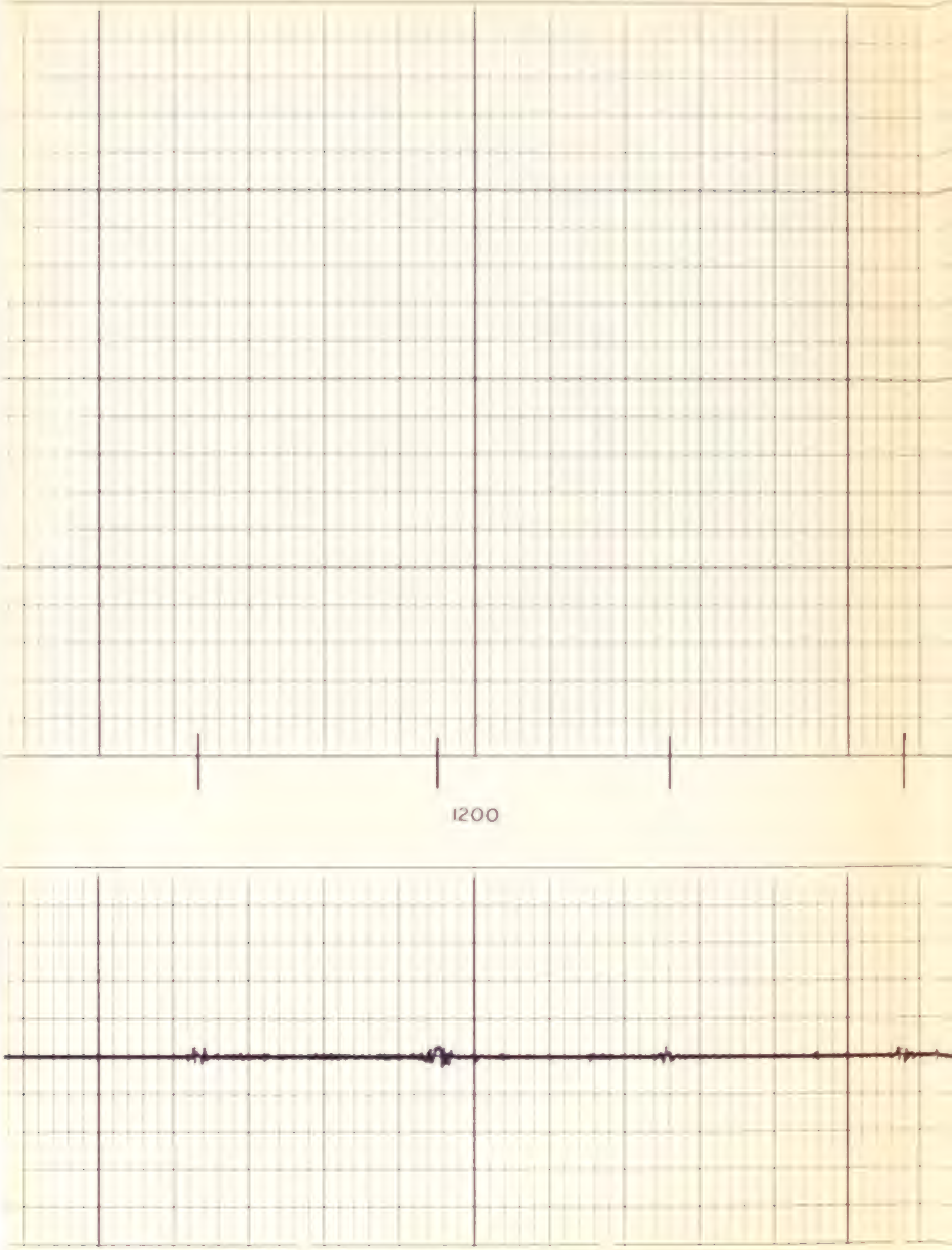
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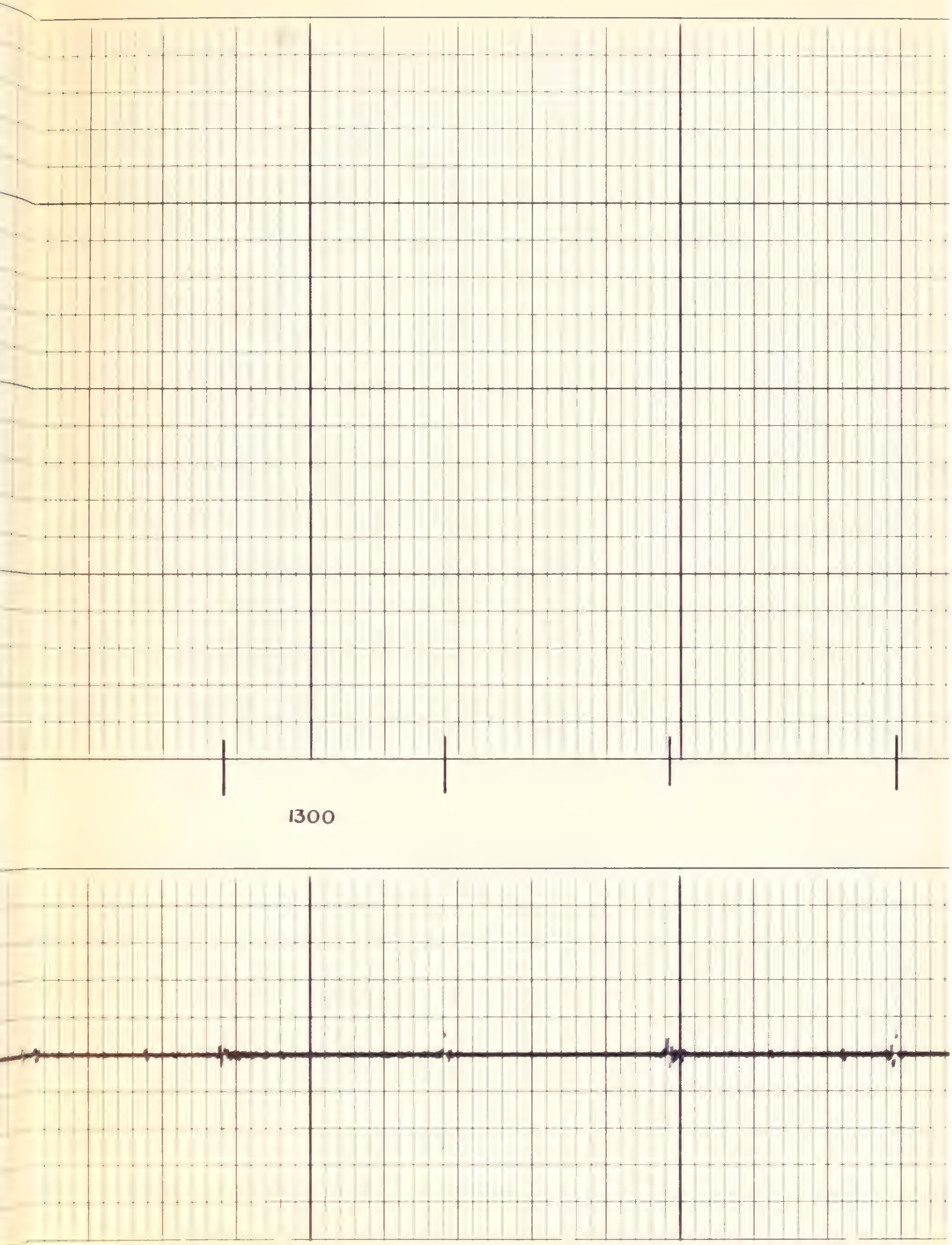
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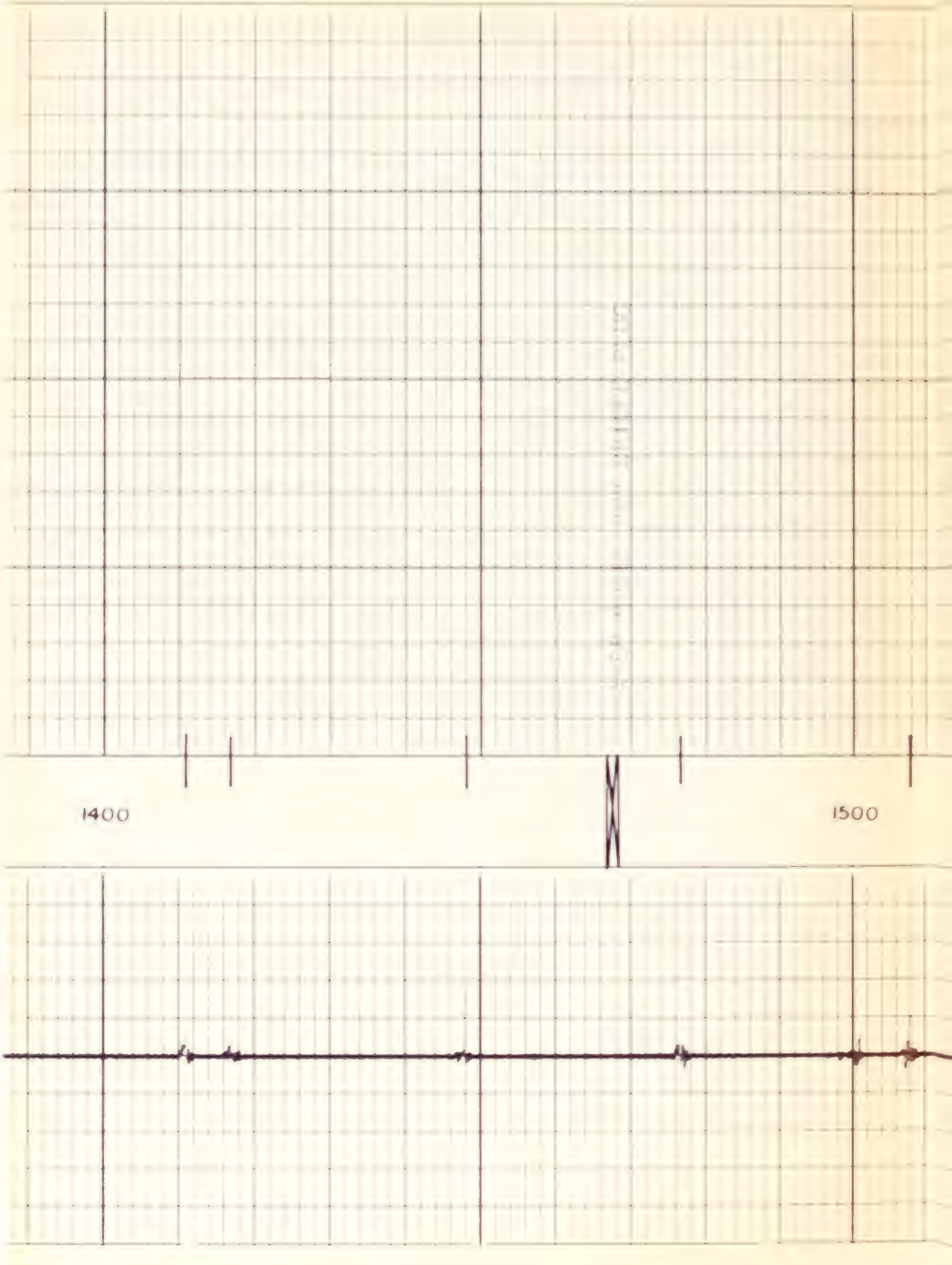
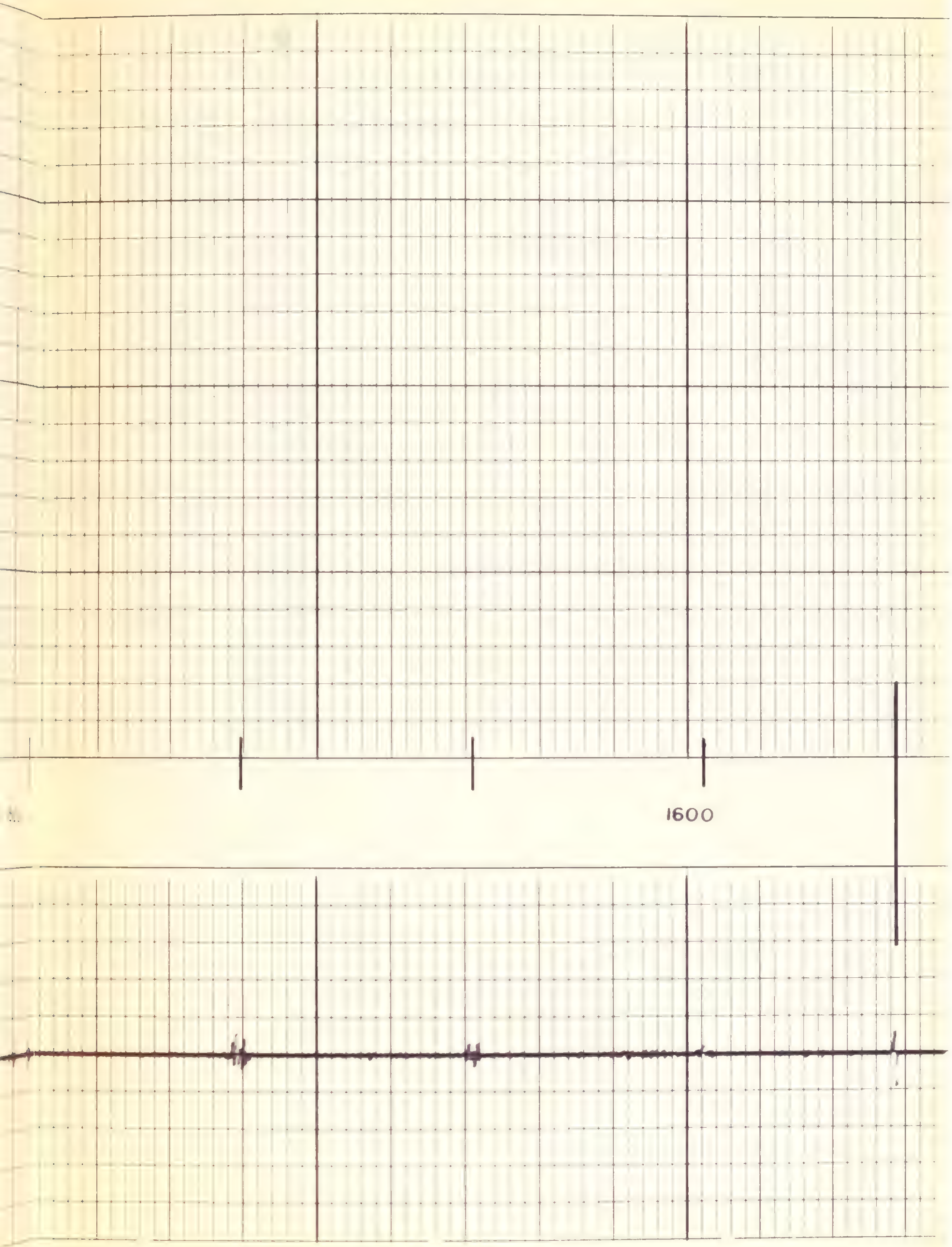
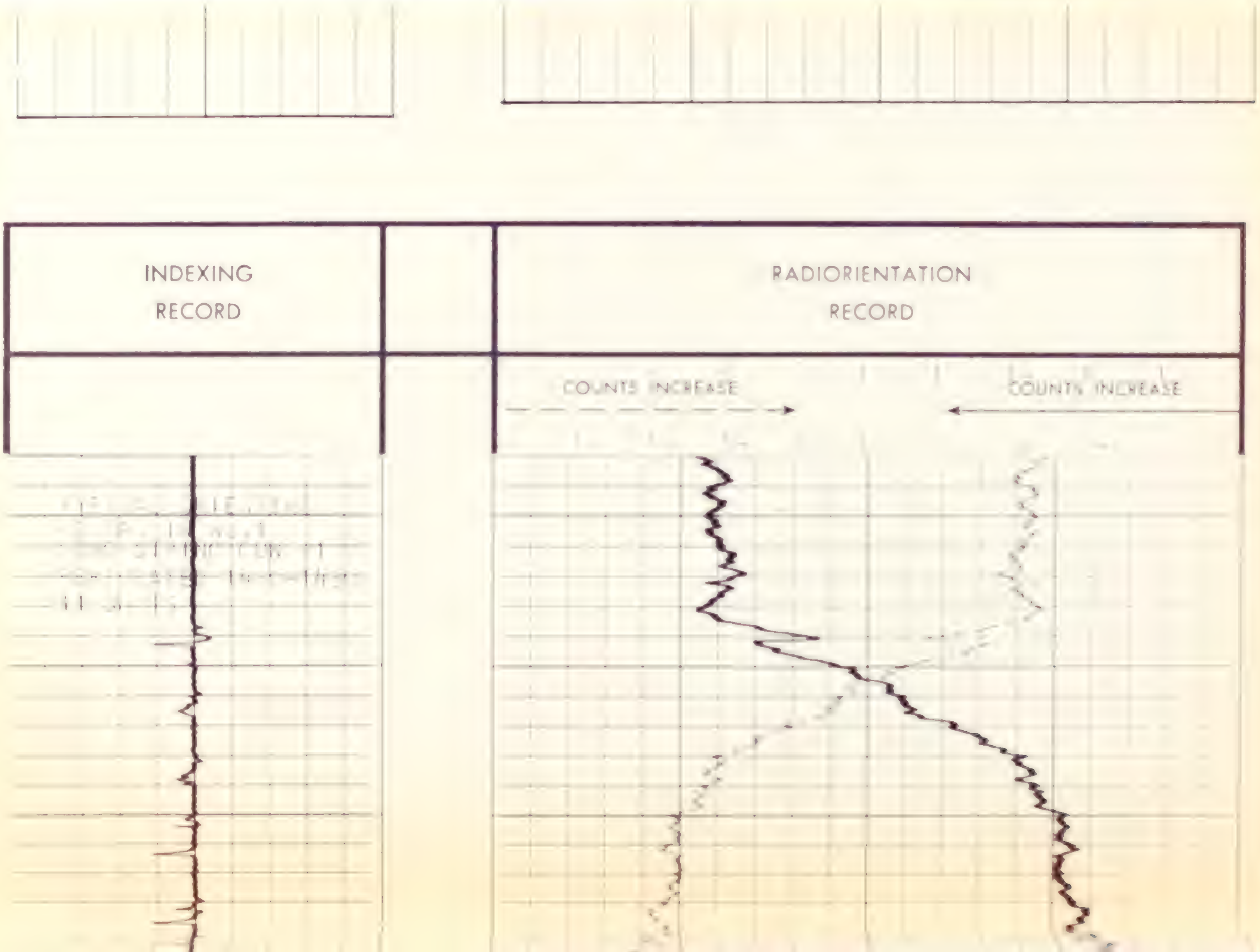
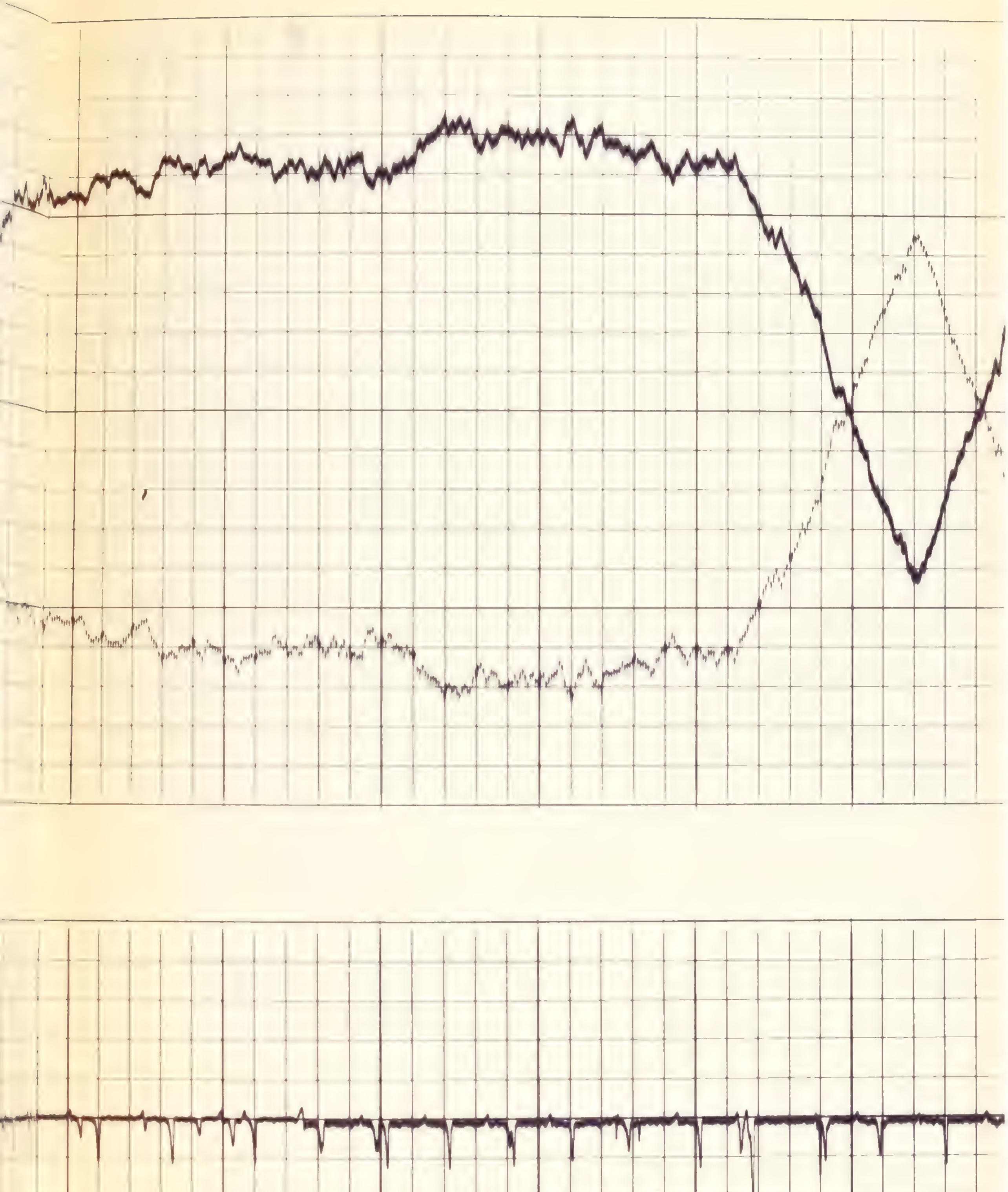
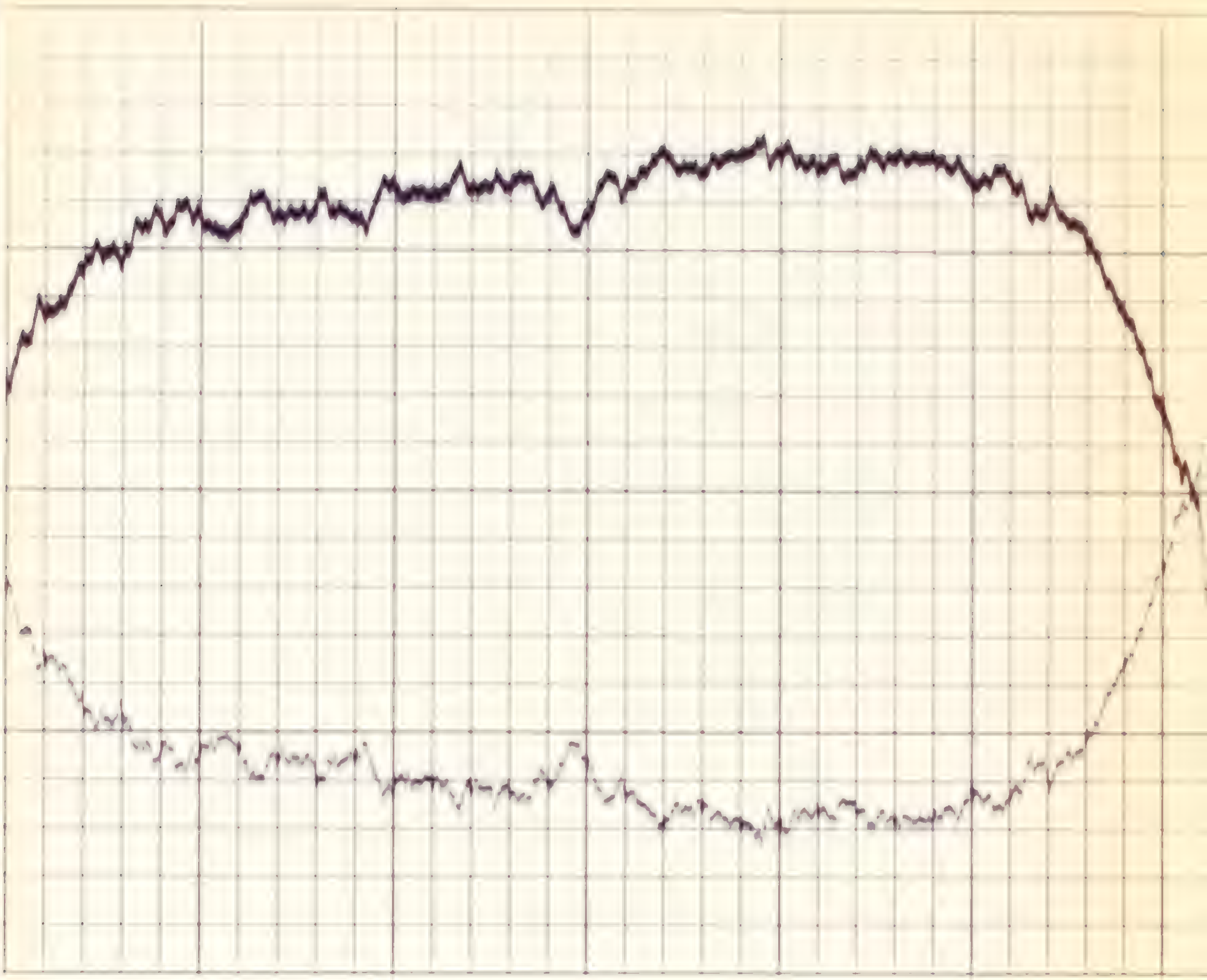
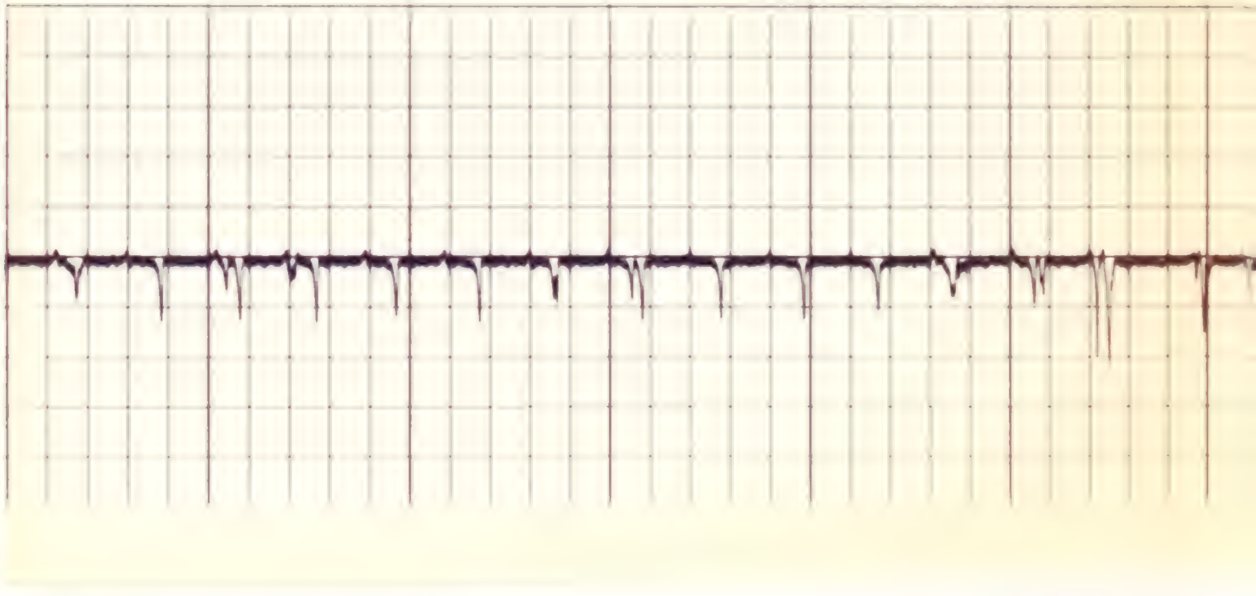

1400
1500

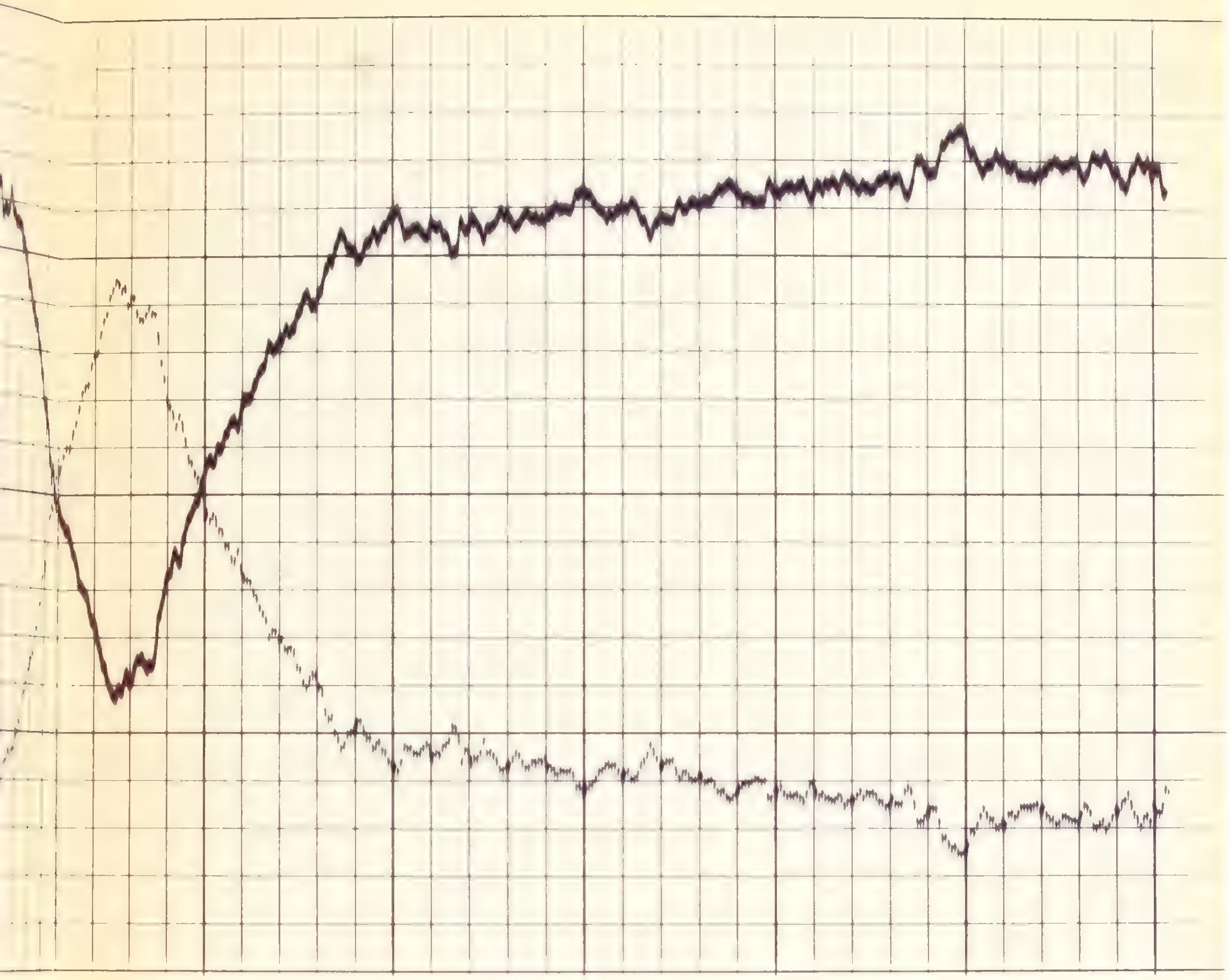

1600

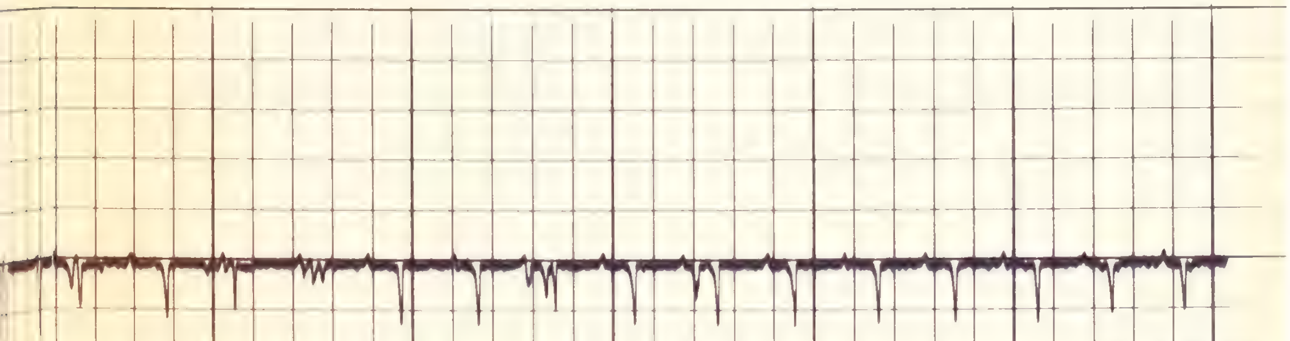

INDEXING RECORD
RADIORIENTATION RECORD
COUNTS INCREASE
COUNTS INCREASE





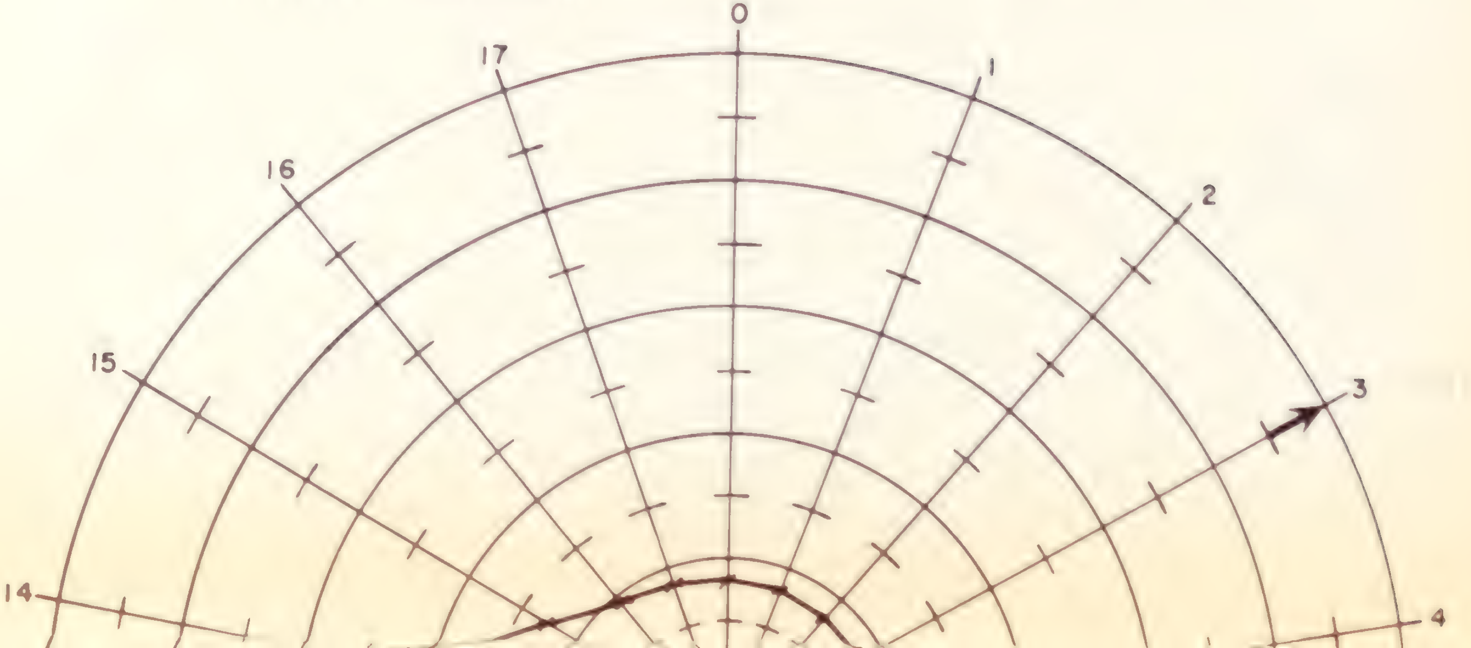


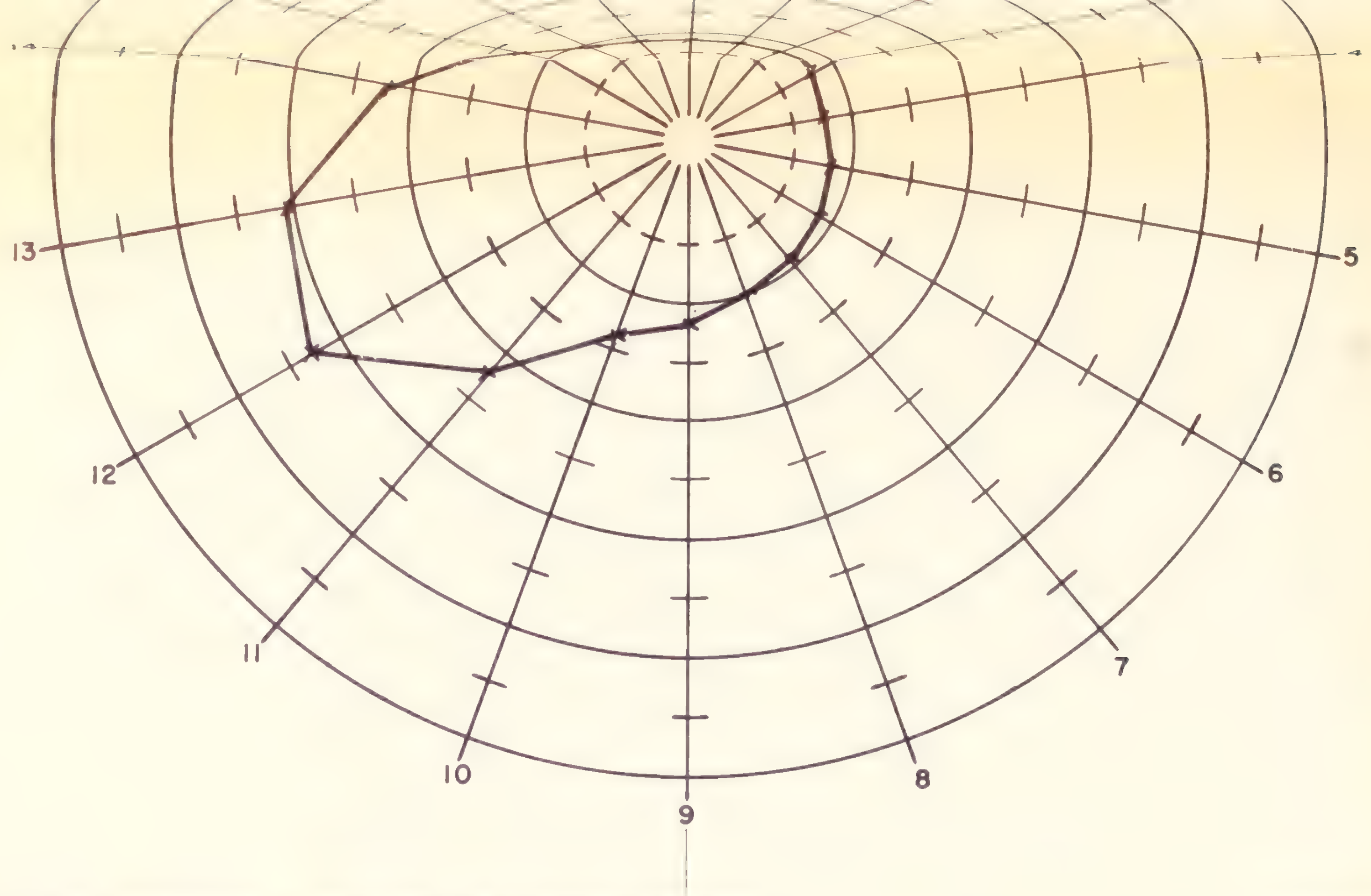




RADIORIENTATION PLOT

POT-B





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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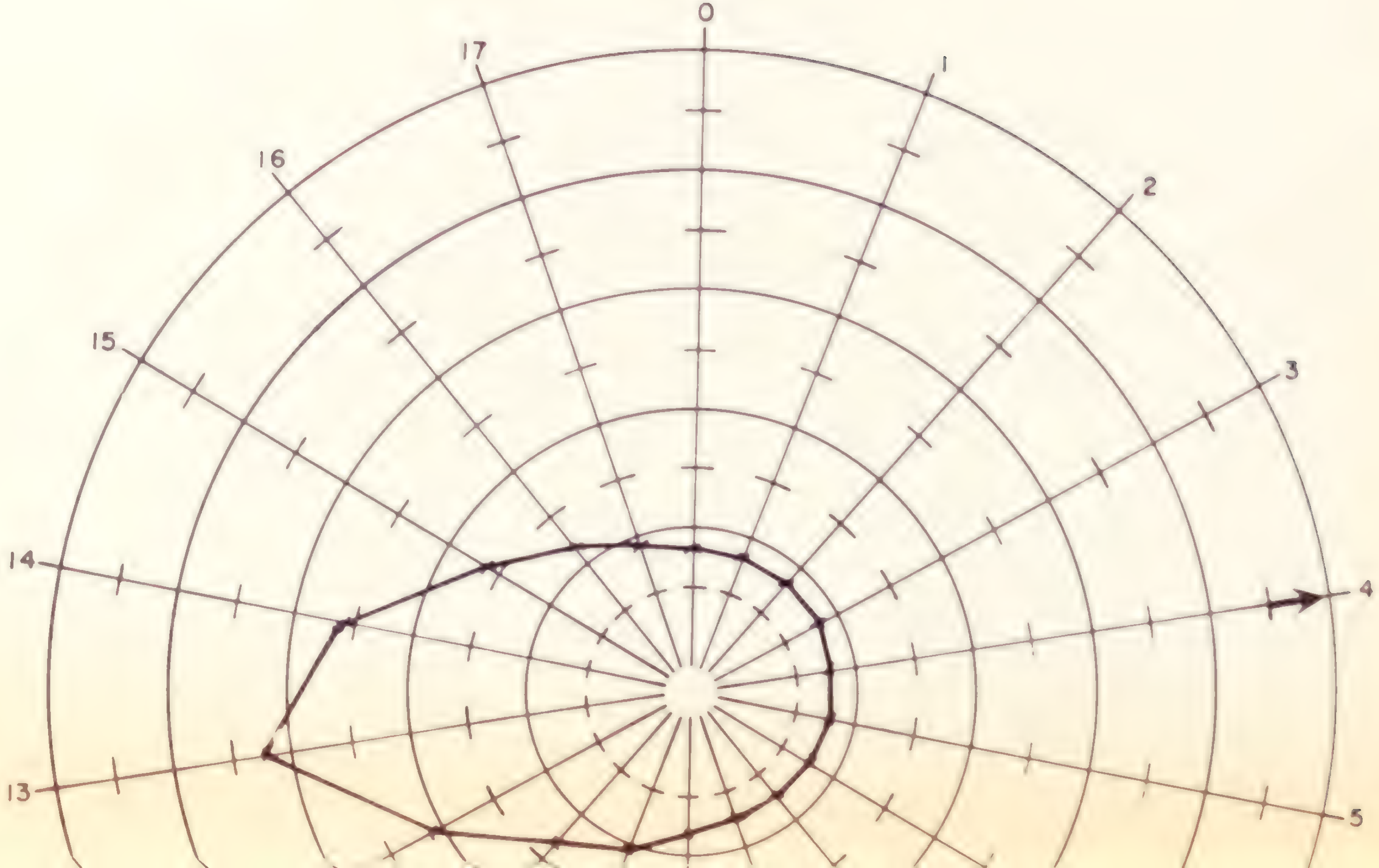
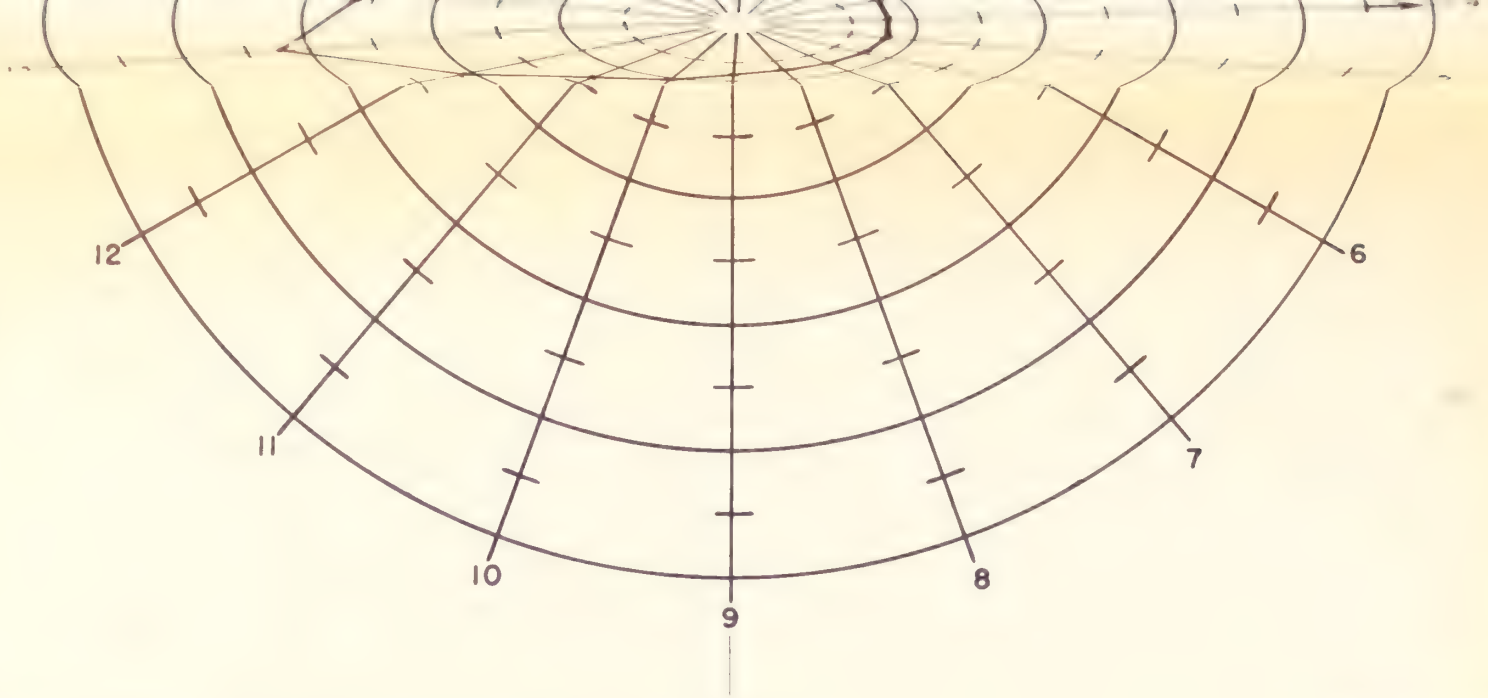
RADIORIENTATION PLOT

POT-B





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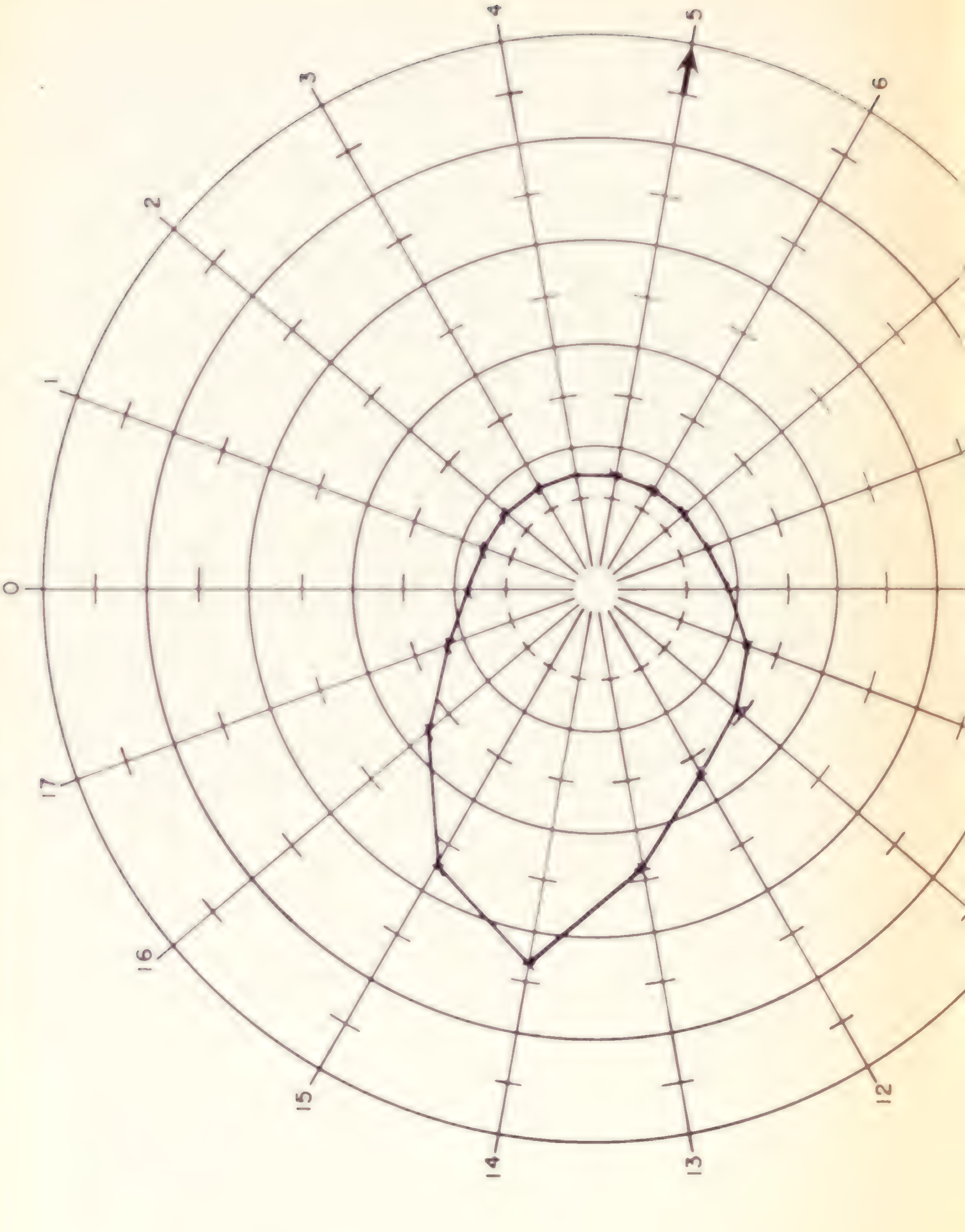
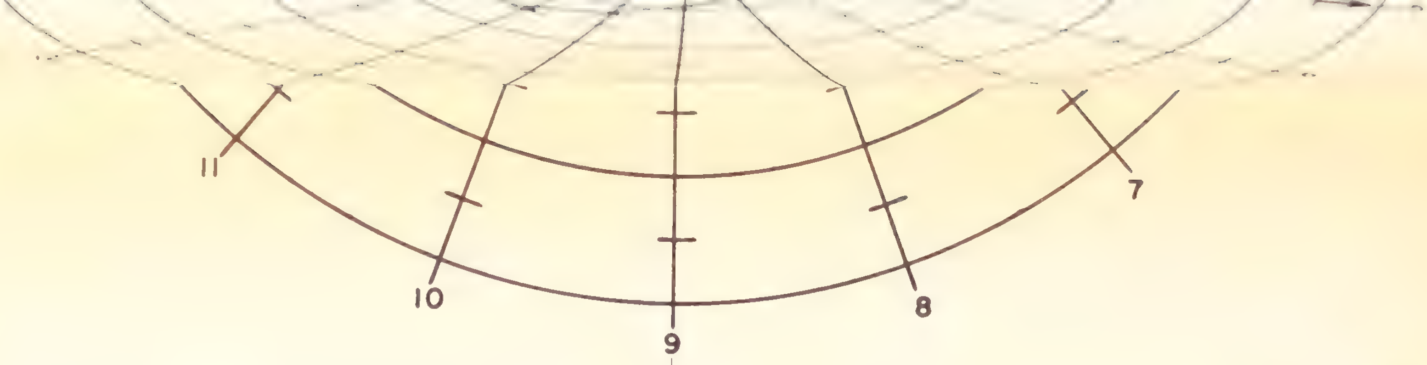
RADIORIENTATION PLOT

POT-B


0
1
2
3
4
5
6
12
13
14
15
16
17



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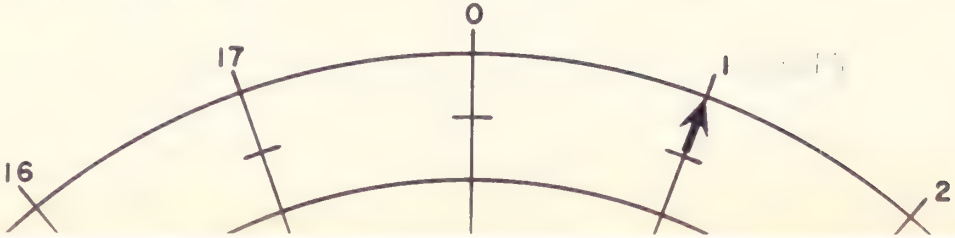
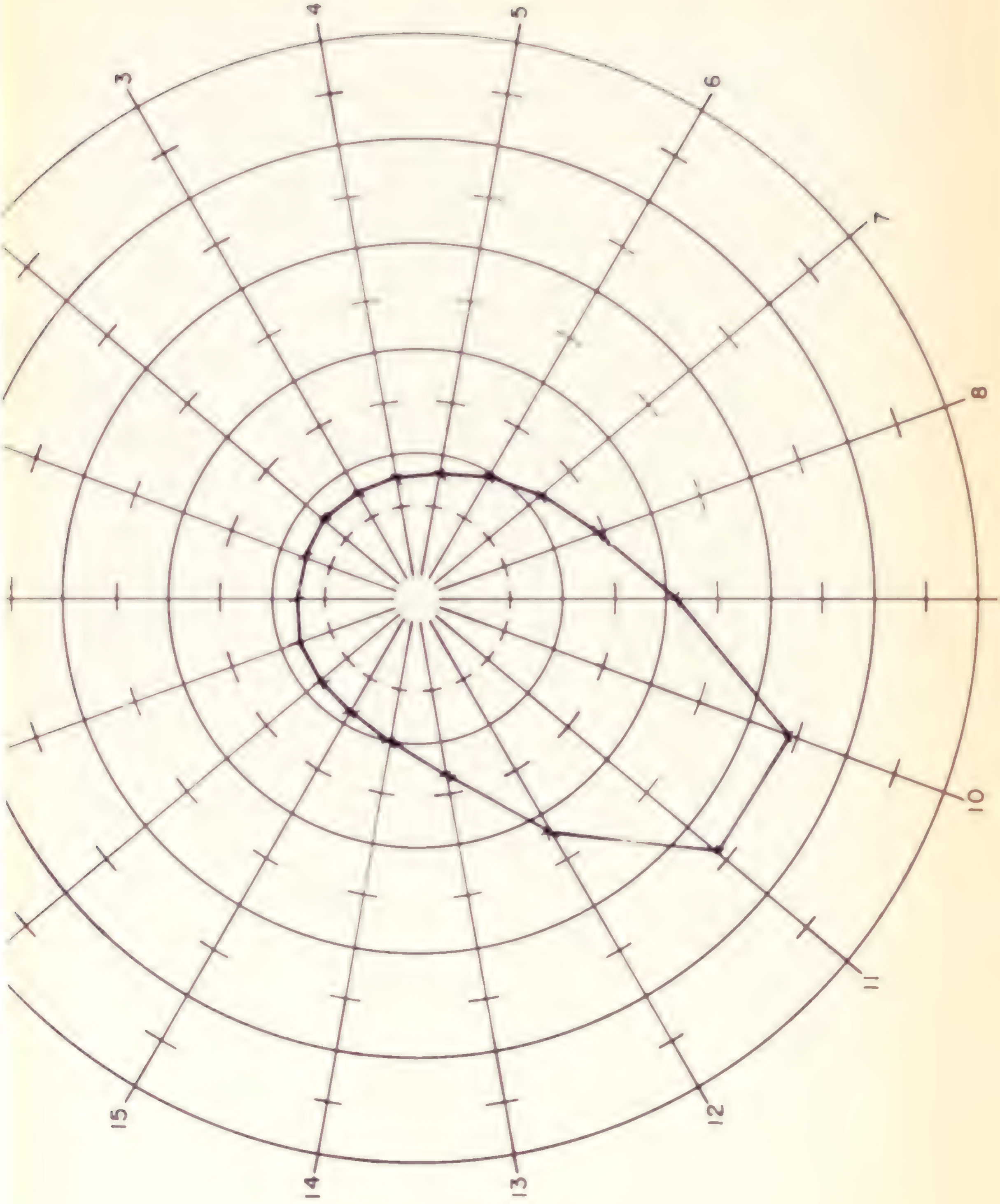
Schlumberger

RADIORIENTATION PLOT

POT-B




3
4
5
6
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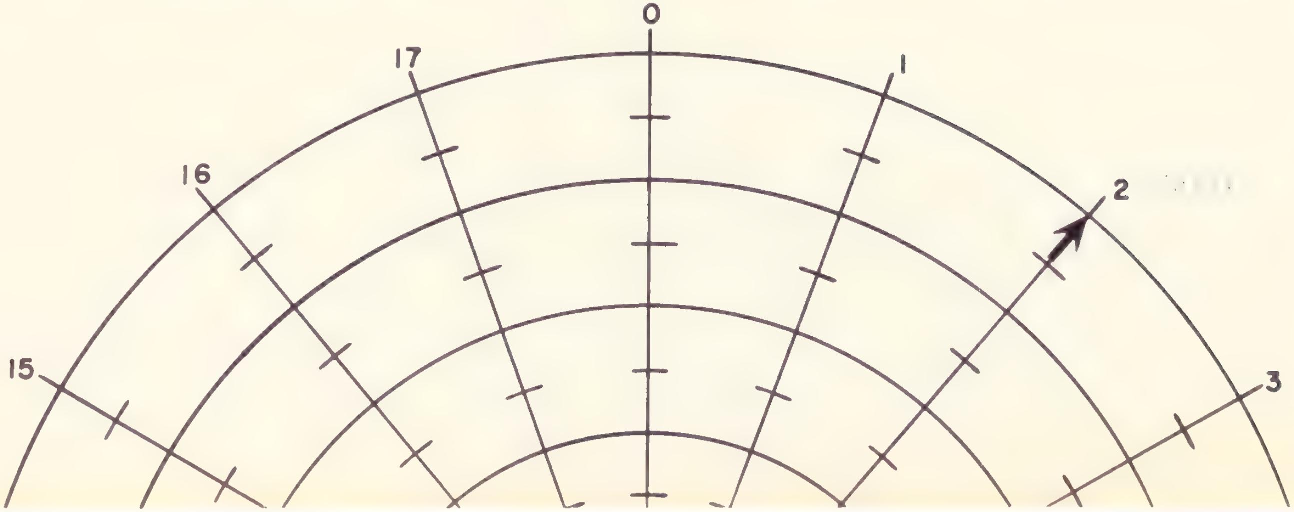
10
11
12
13
14
15

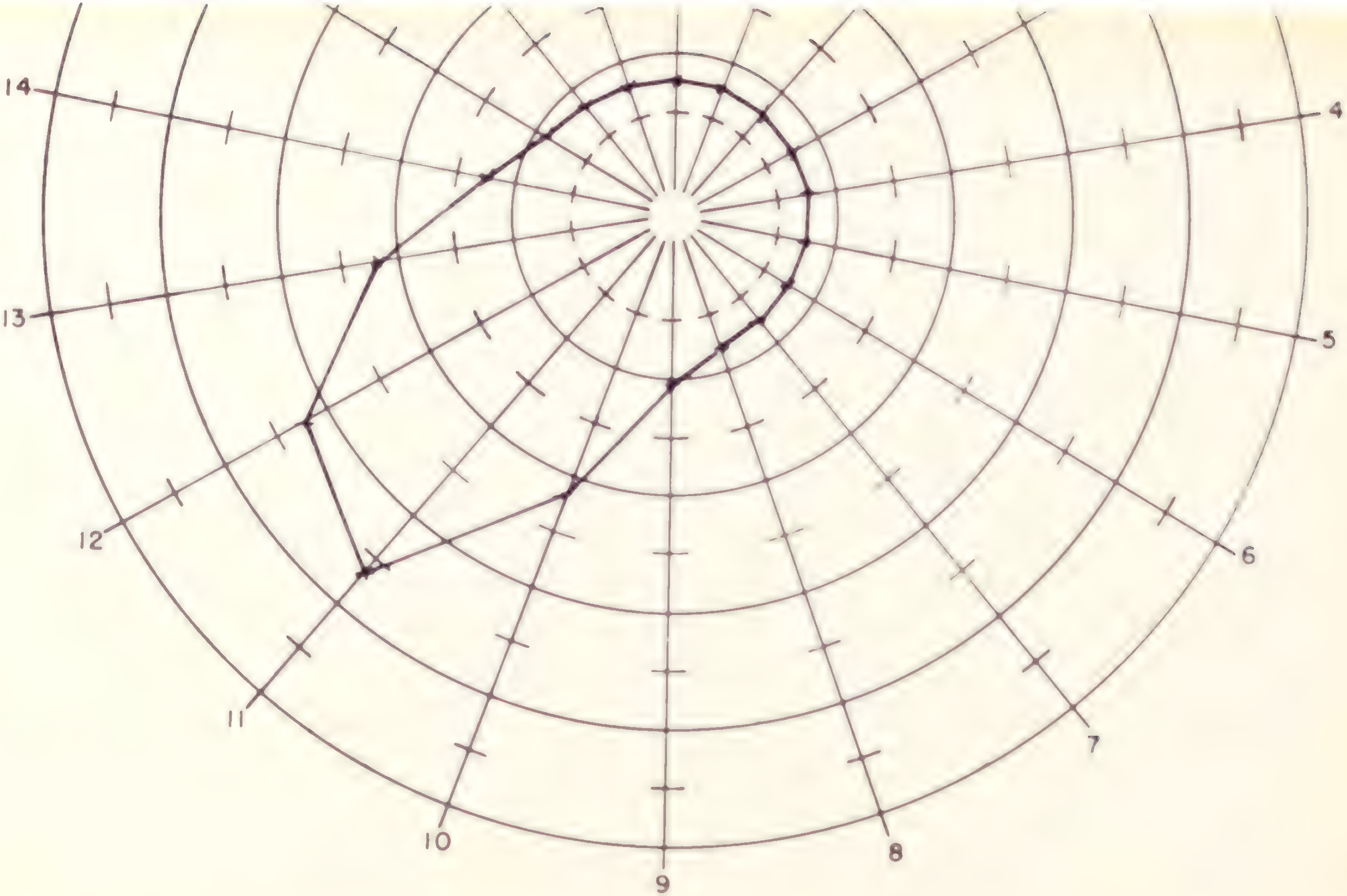
This chart, computation and or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B



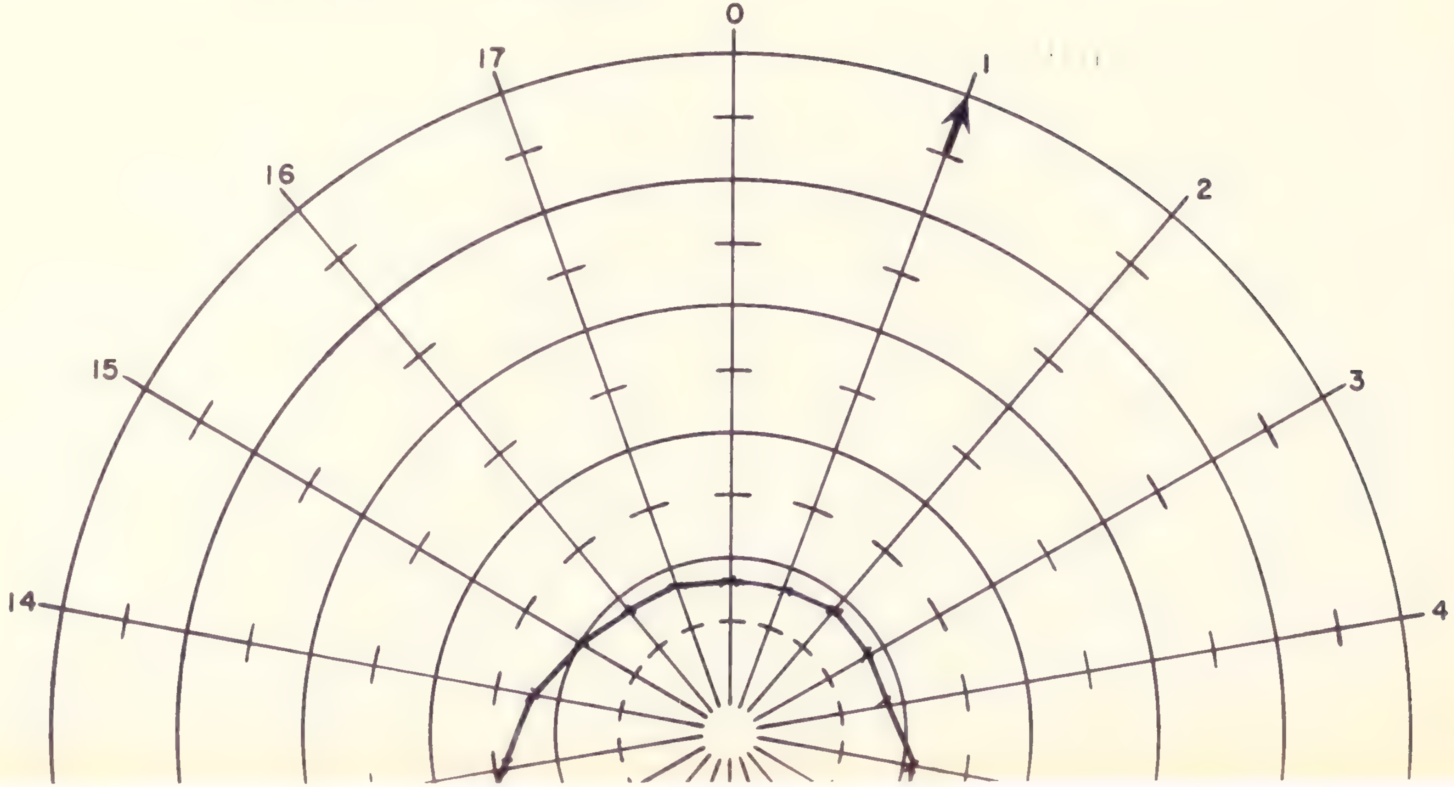


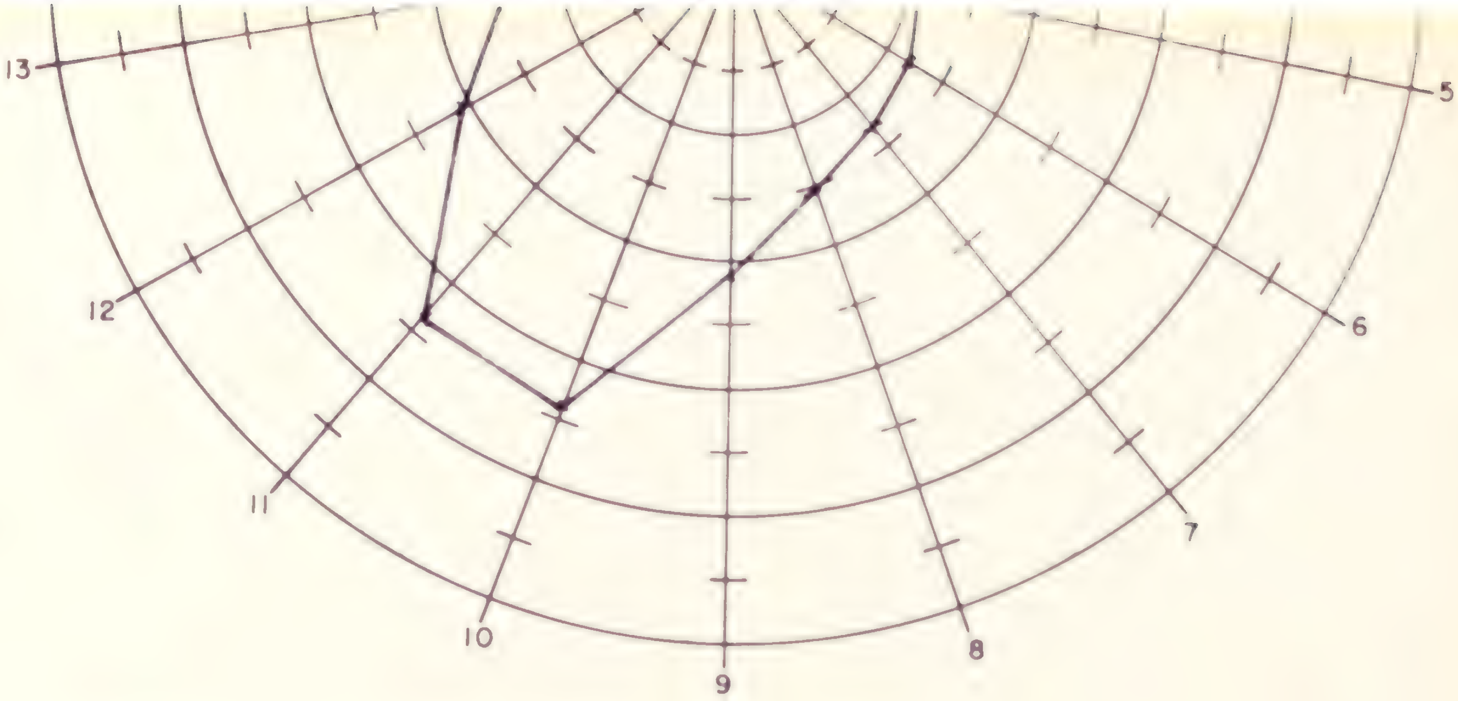
This chart, computation and/or interpretation [illegible]

Schlumberger

RADIORIENTATION PLOT

POT-B



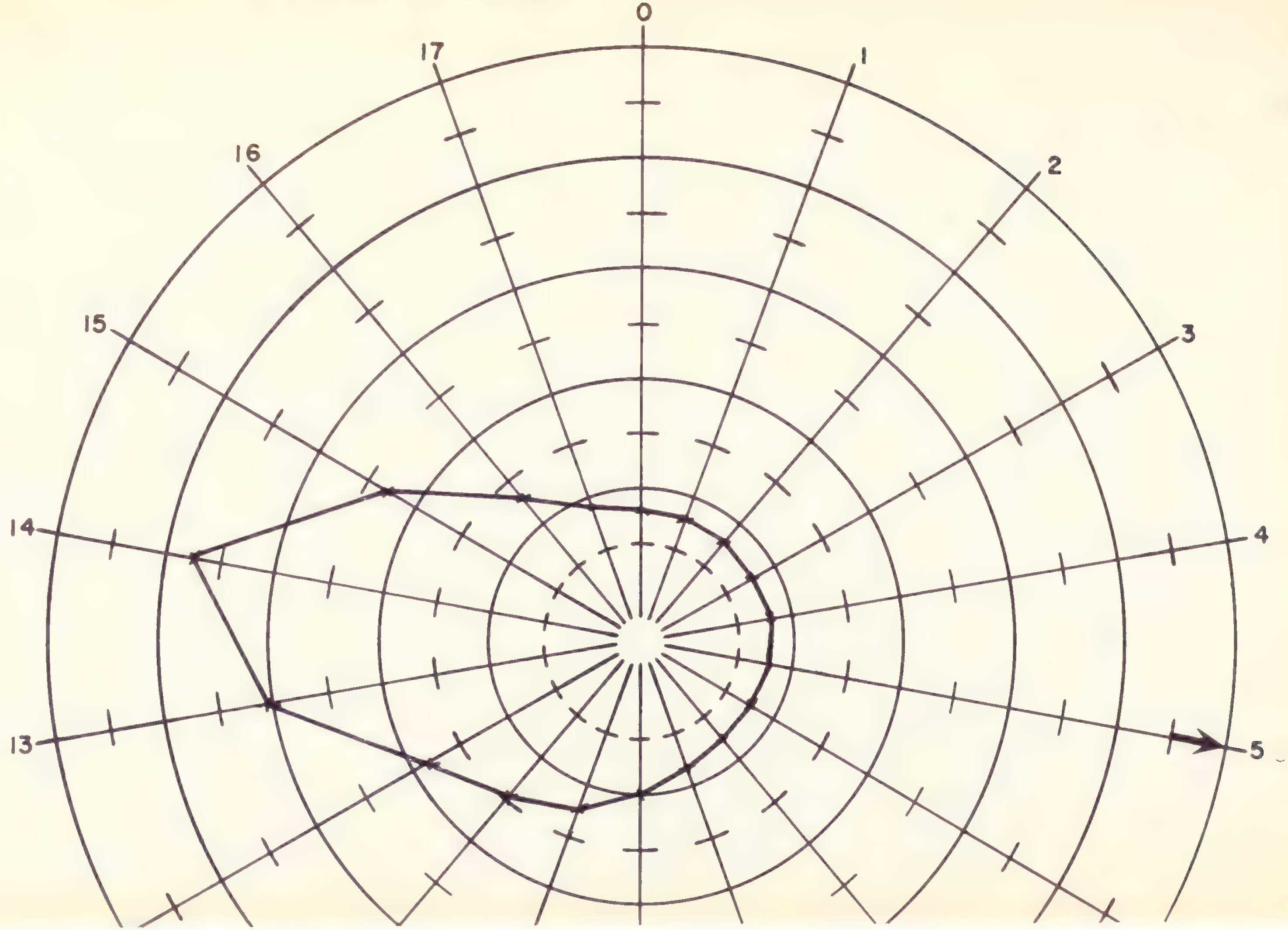


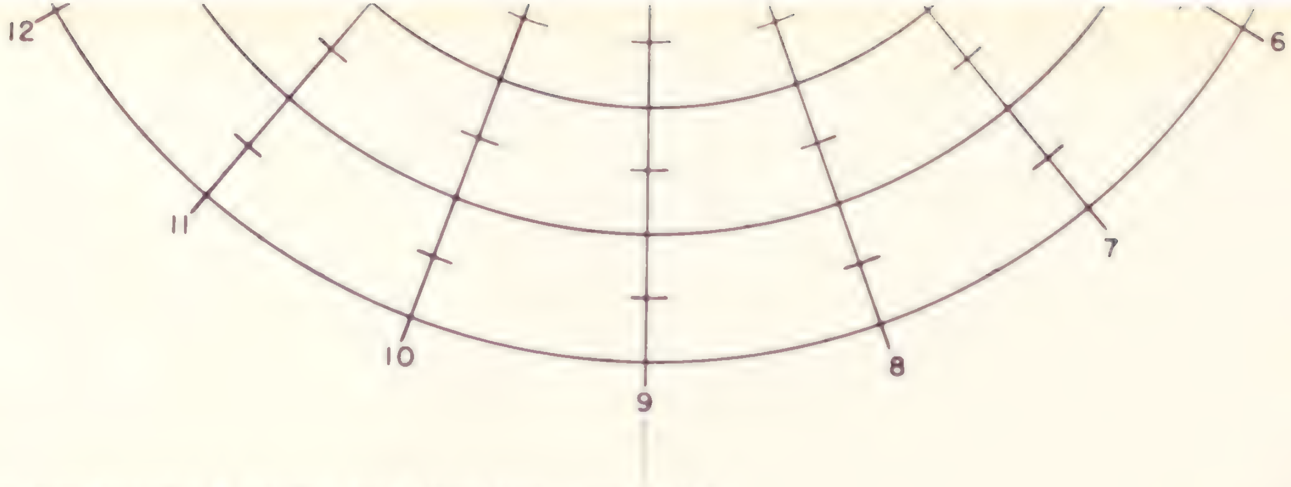
This chart, computation and/or interpretation [illegible]

Schlumberger

RADIORIENTATION PLOT

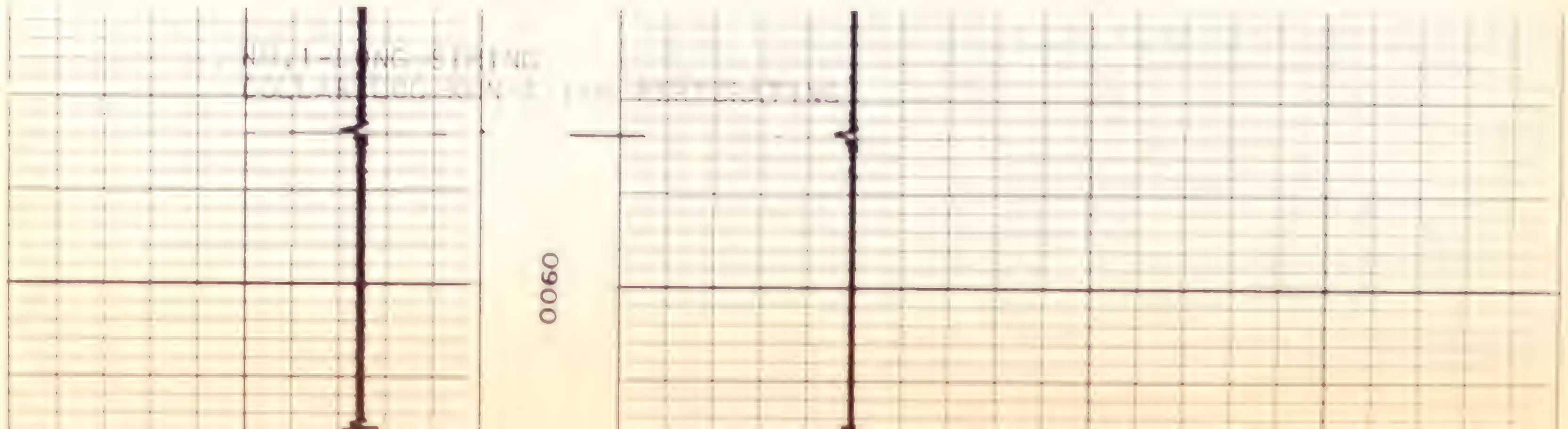
POT-B

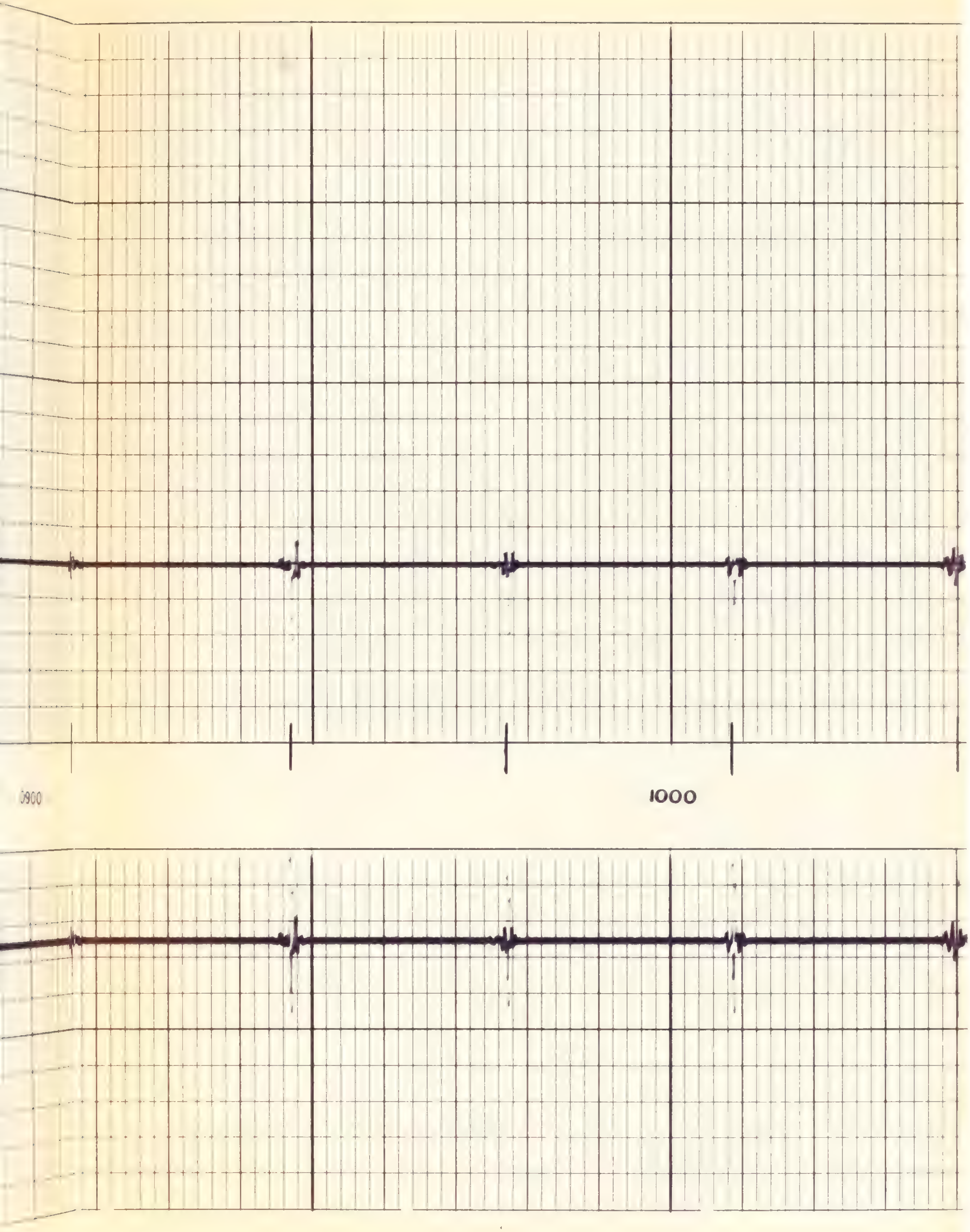




This chart, computation and/or interpretation of our readings from our [illegible] tecting instrument is presented to you in accordance with and subject to the General Terms and Conditions as are set out on pages [illegible] of our current Price Schedule [illegible] side of our Service Order for this job. The readings [illegible] affected by [illegible] in the drill hole and other conditions presented to us.

Schlumberger

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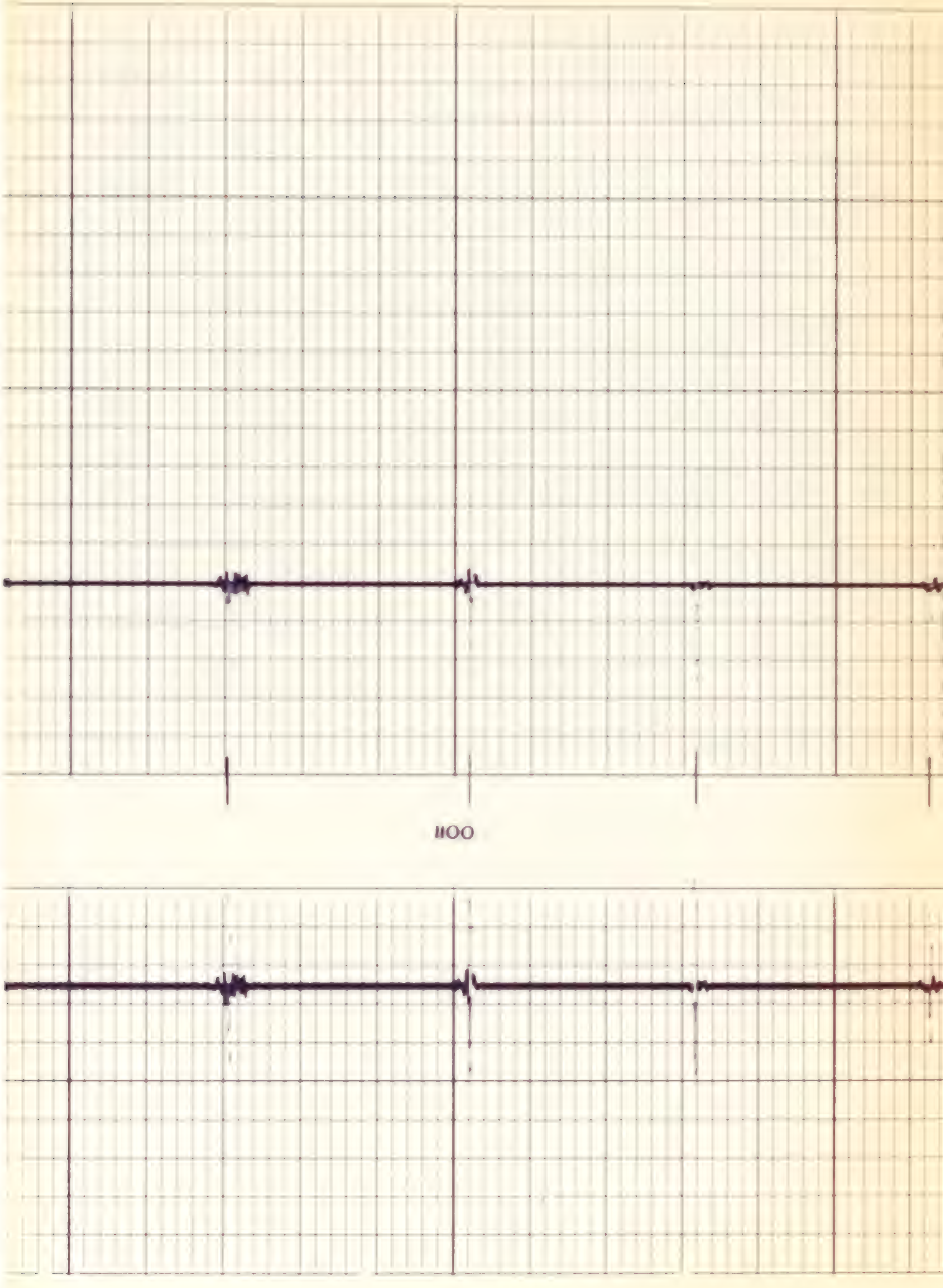
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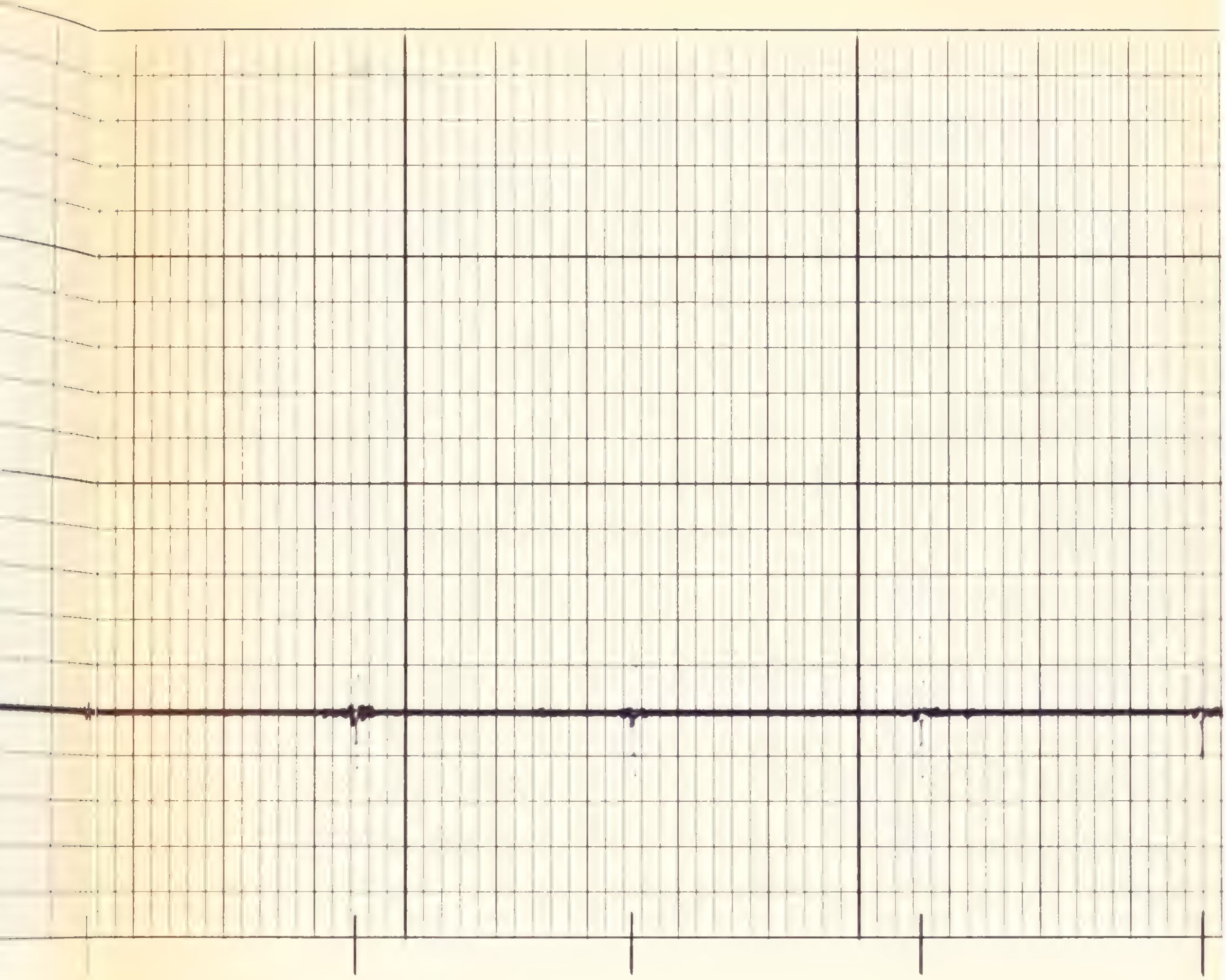

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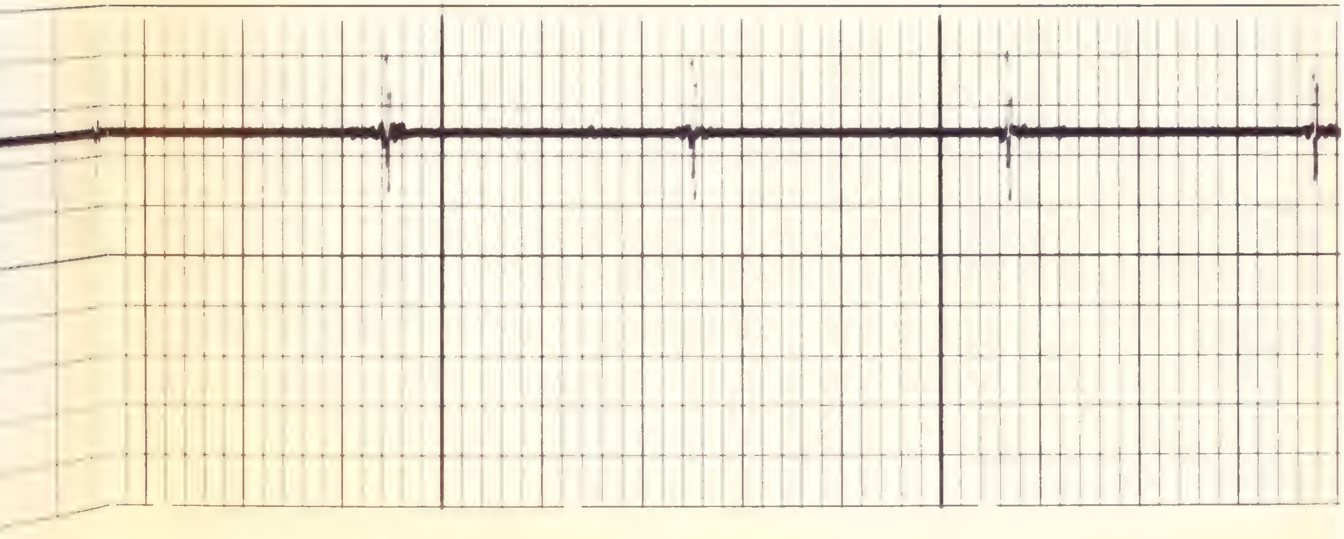

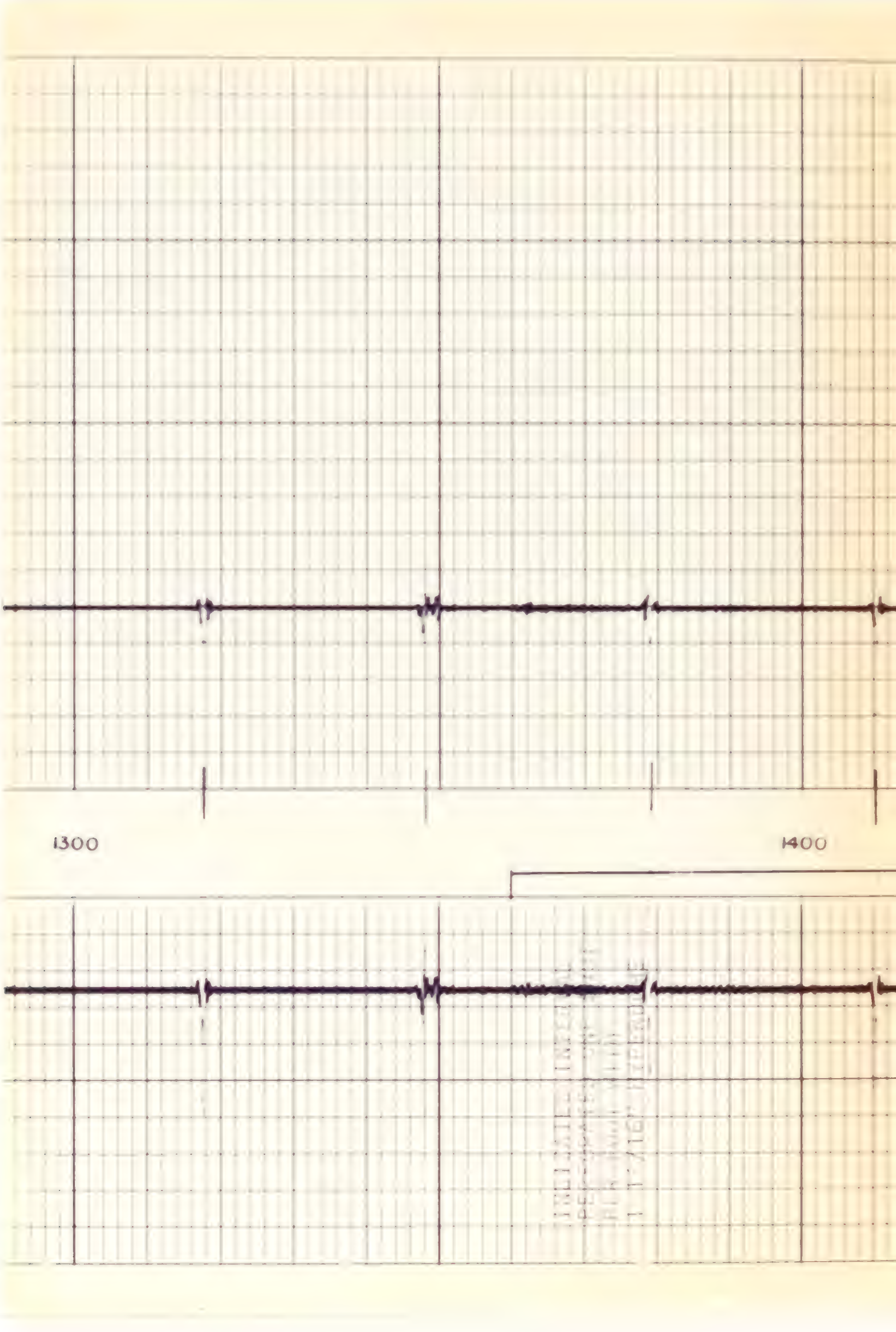
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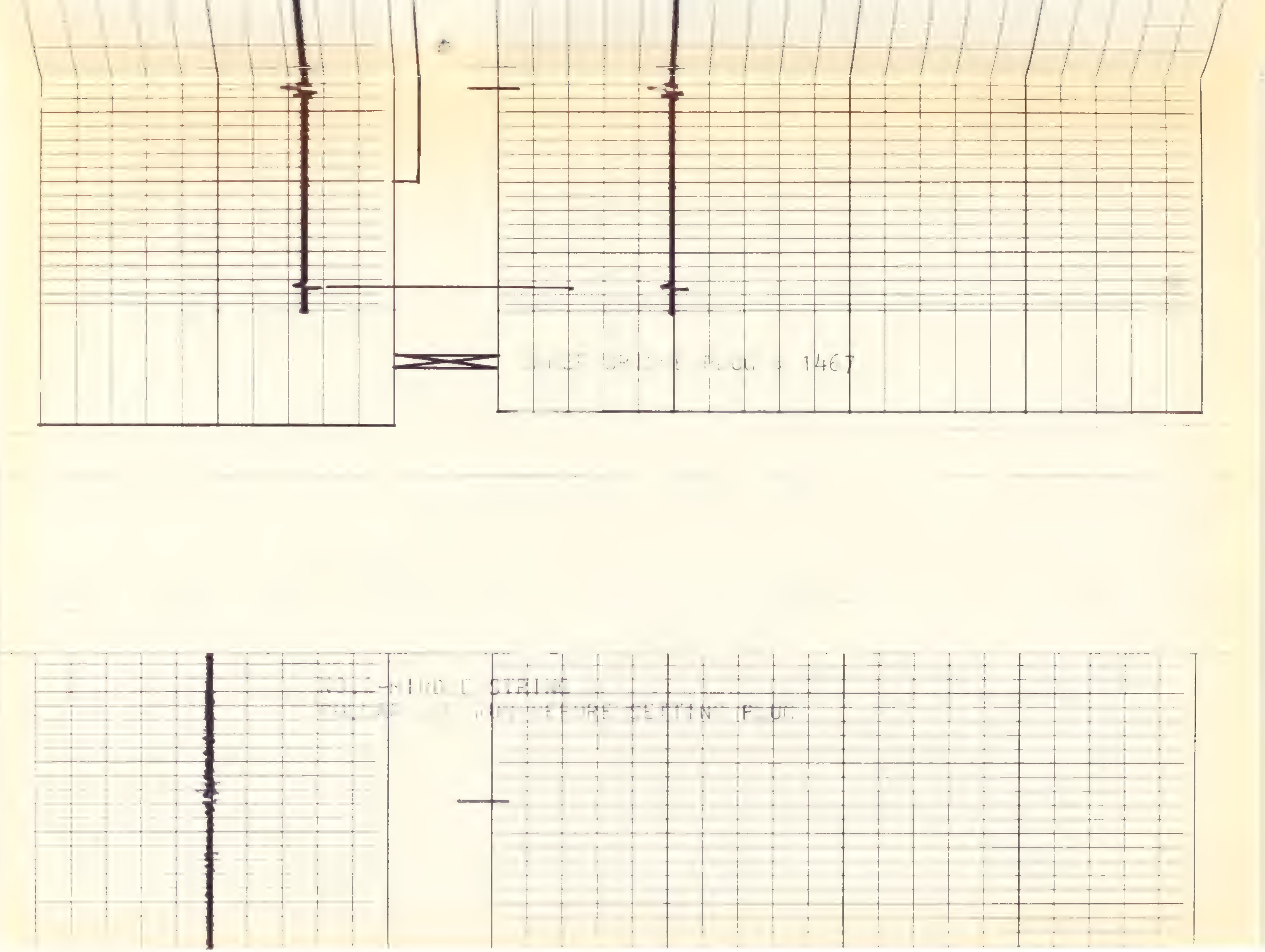
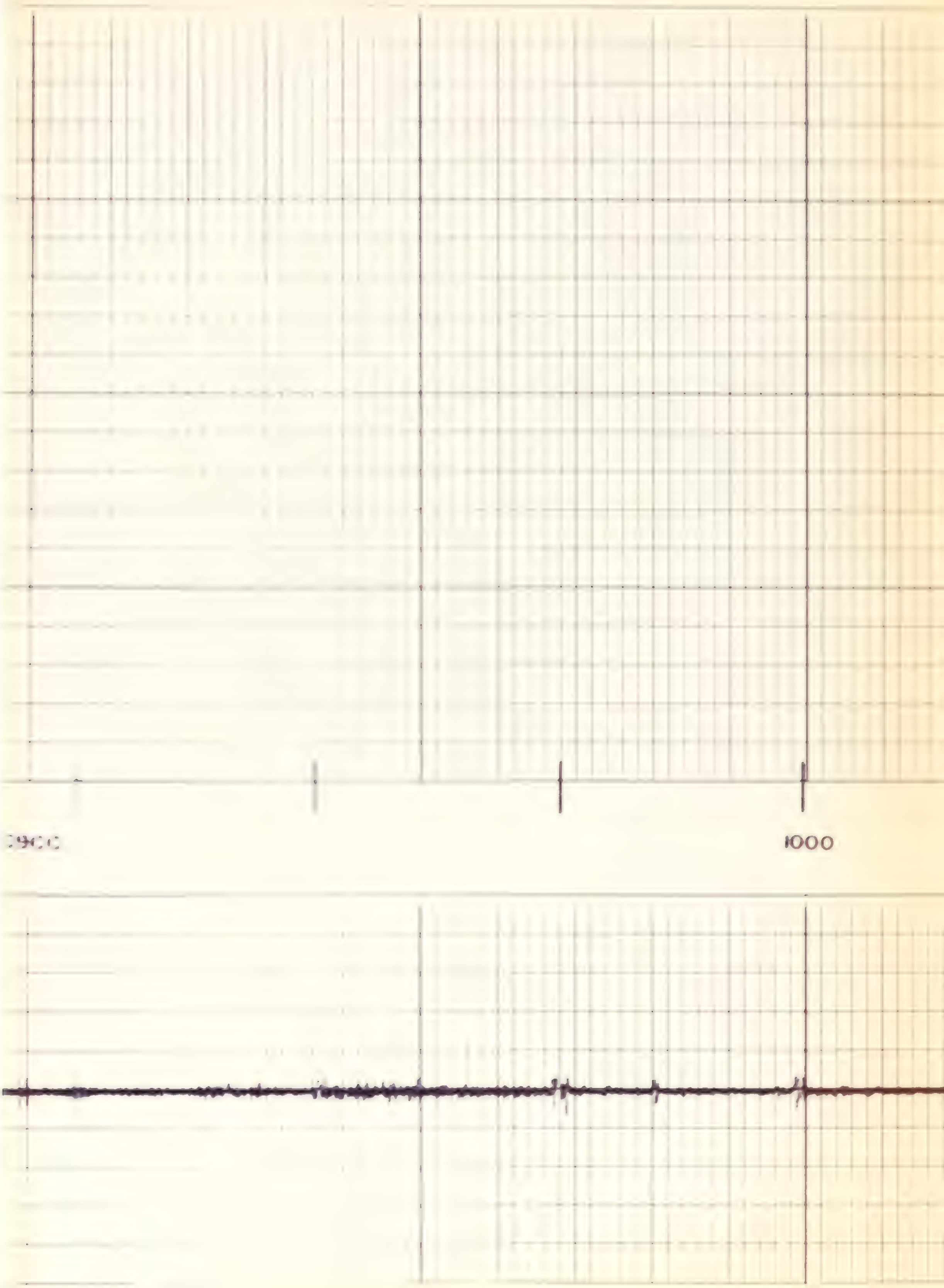
1400


1467
STRING
SETTING PLUG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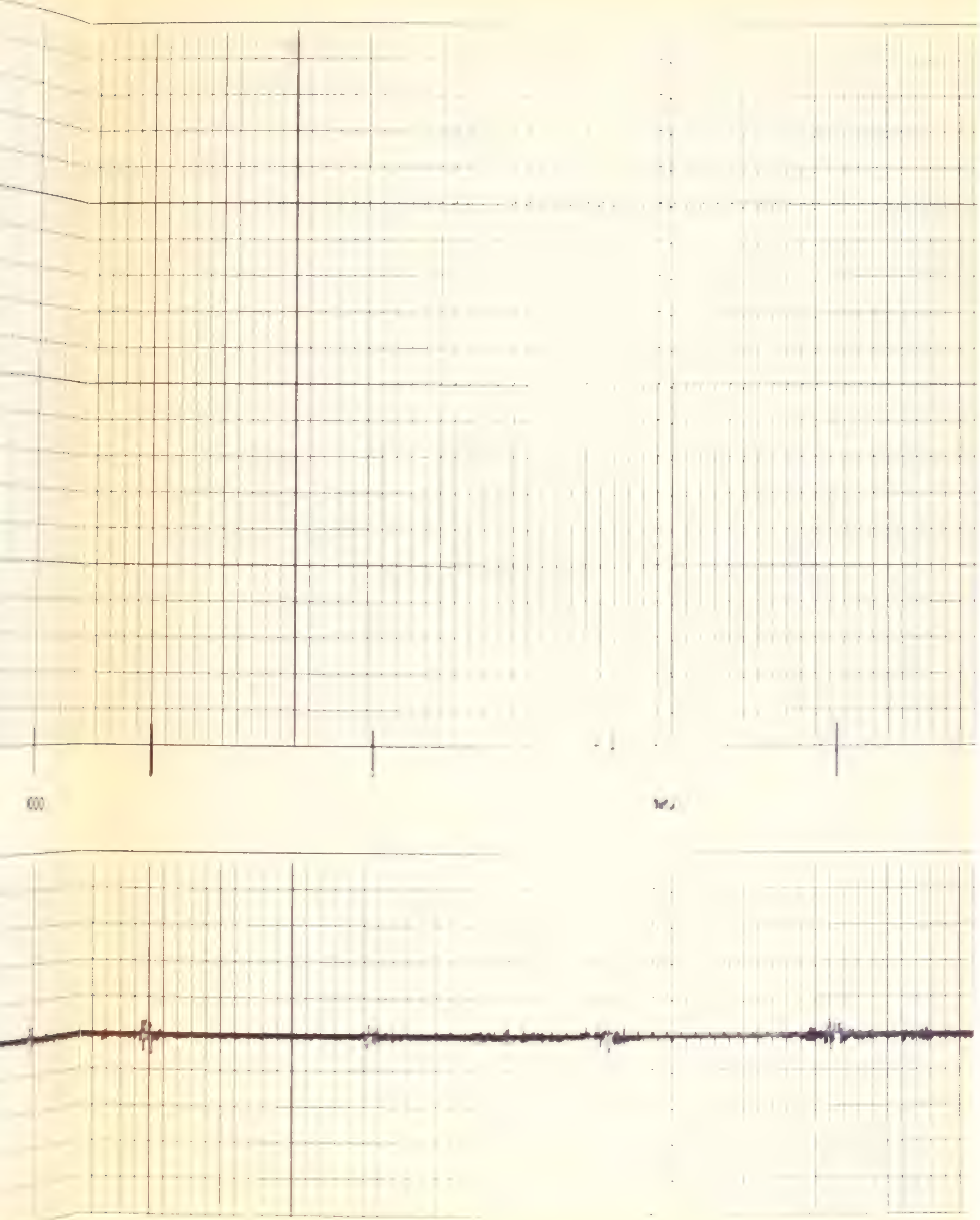
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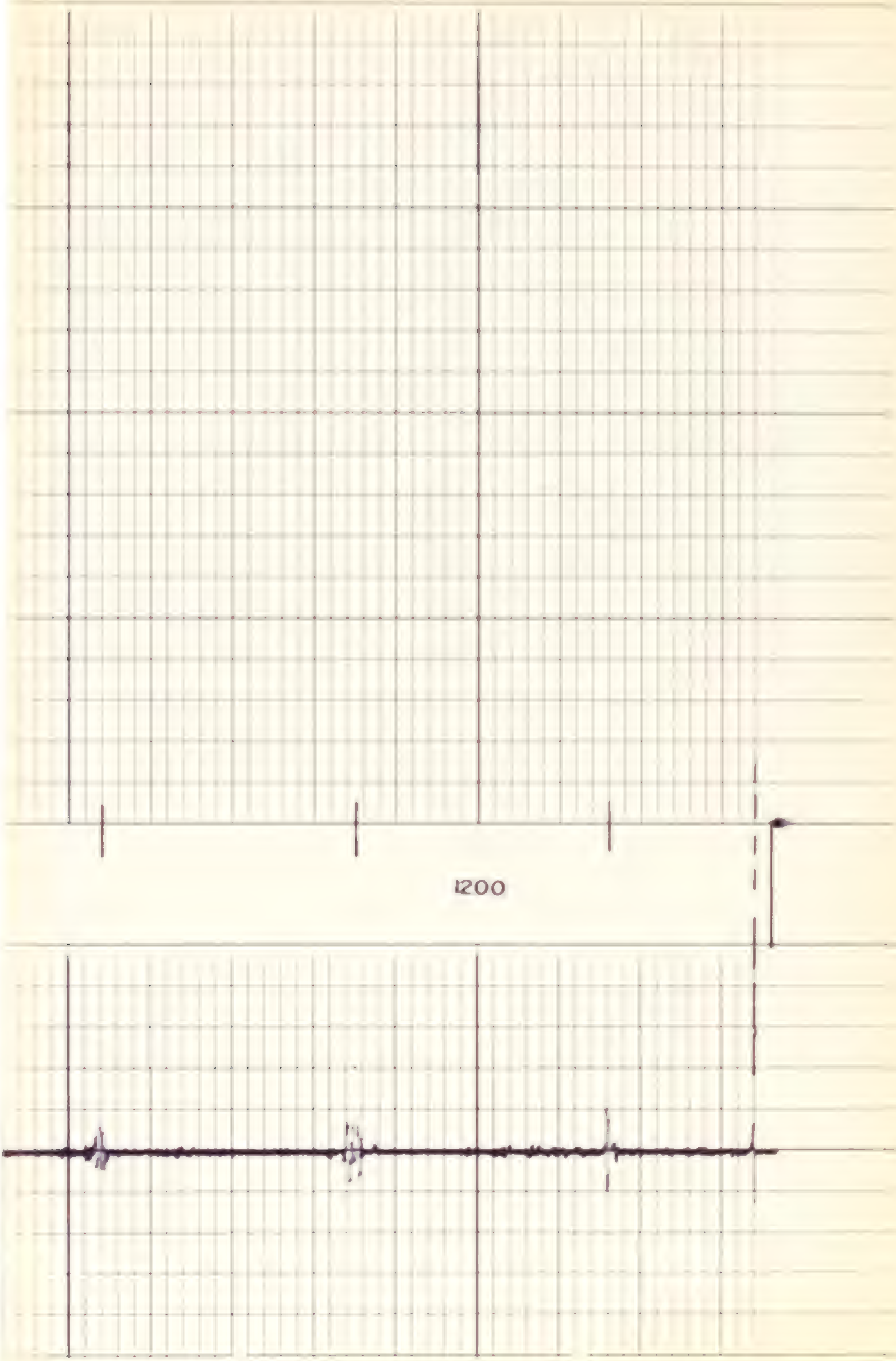
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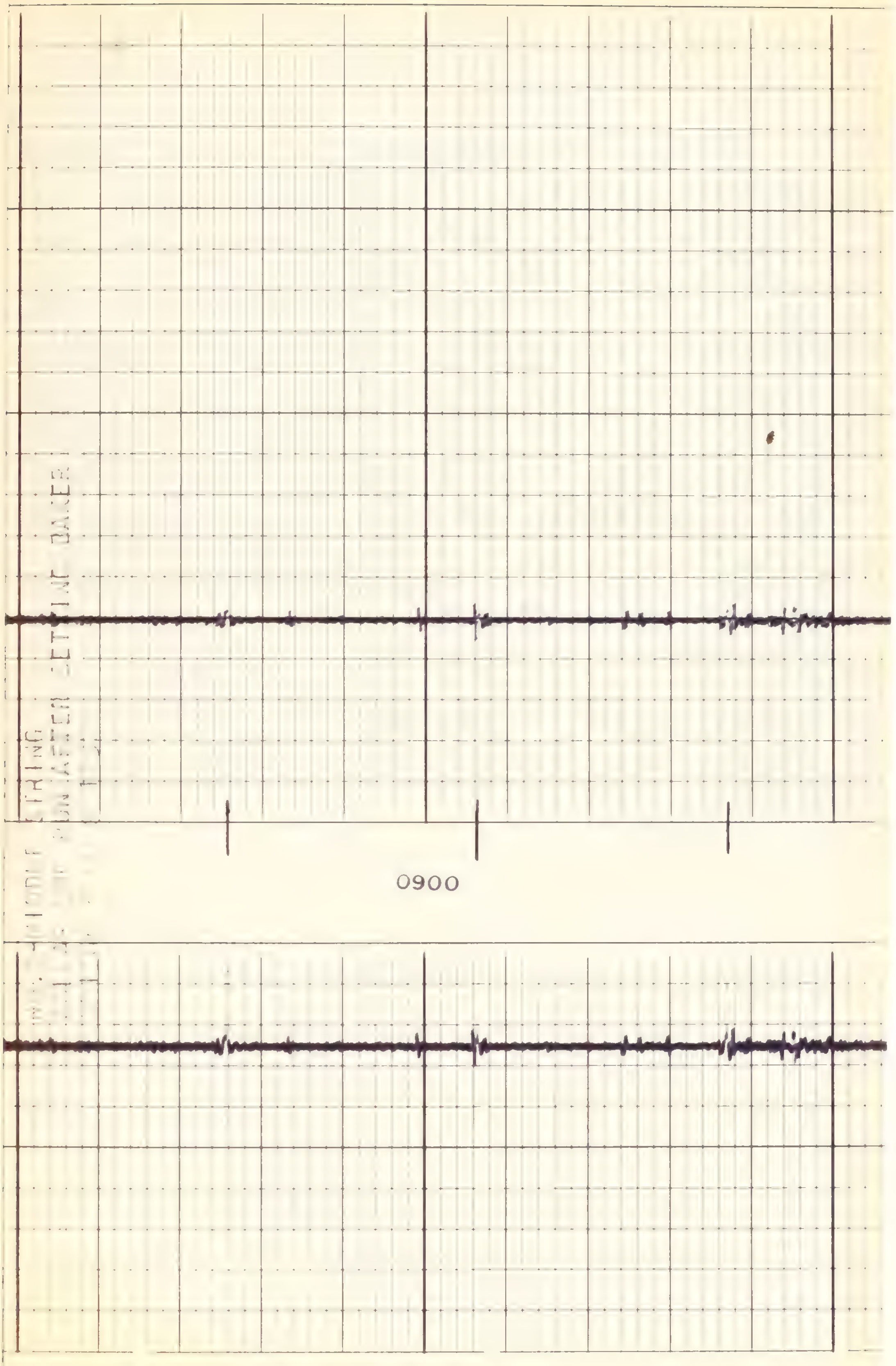
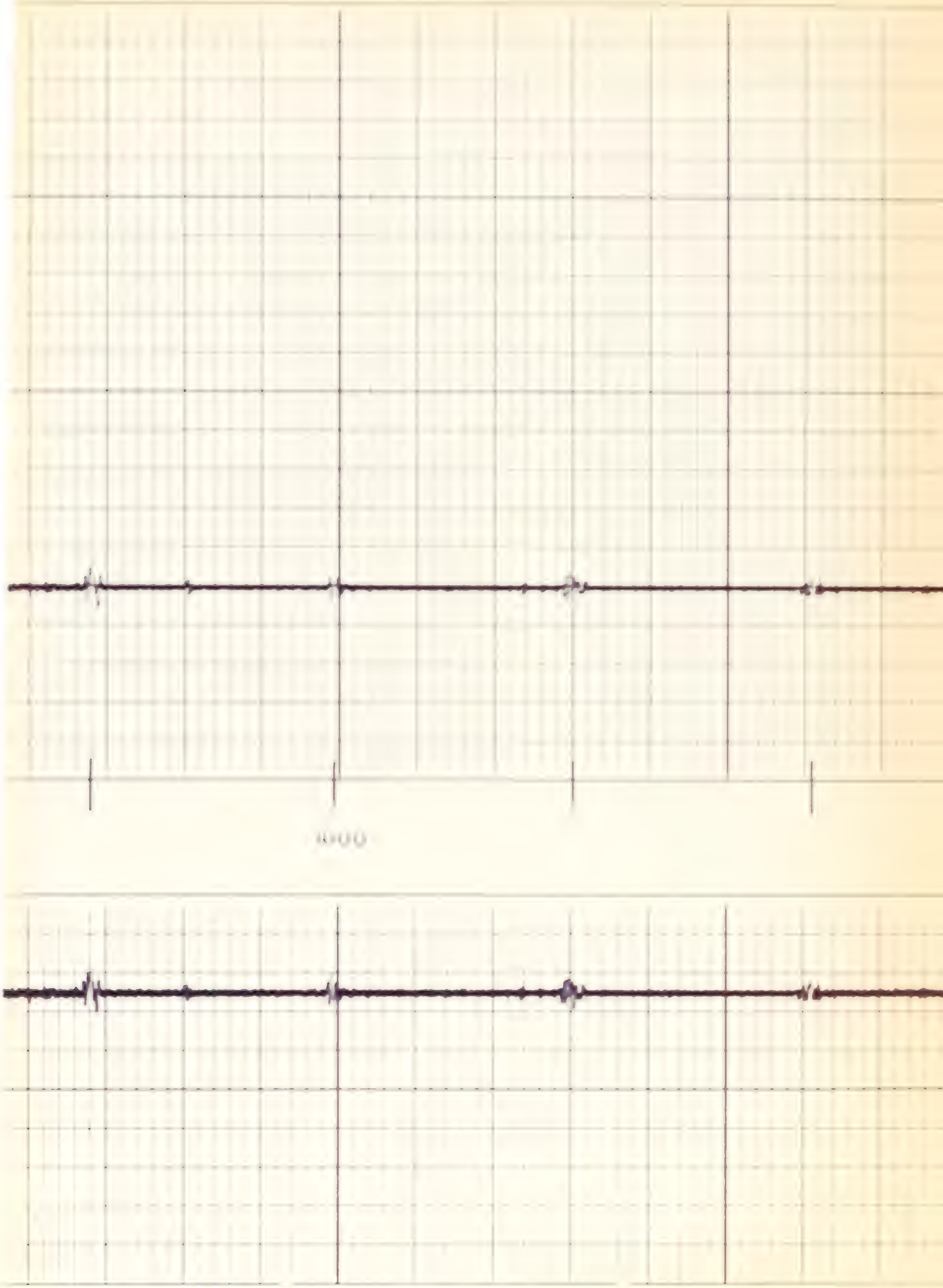

MIDDLE STRING
ON AFTER SETTING BAKER
0900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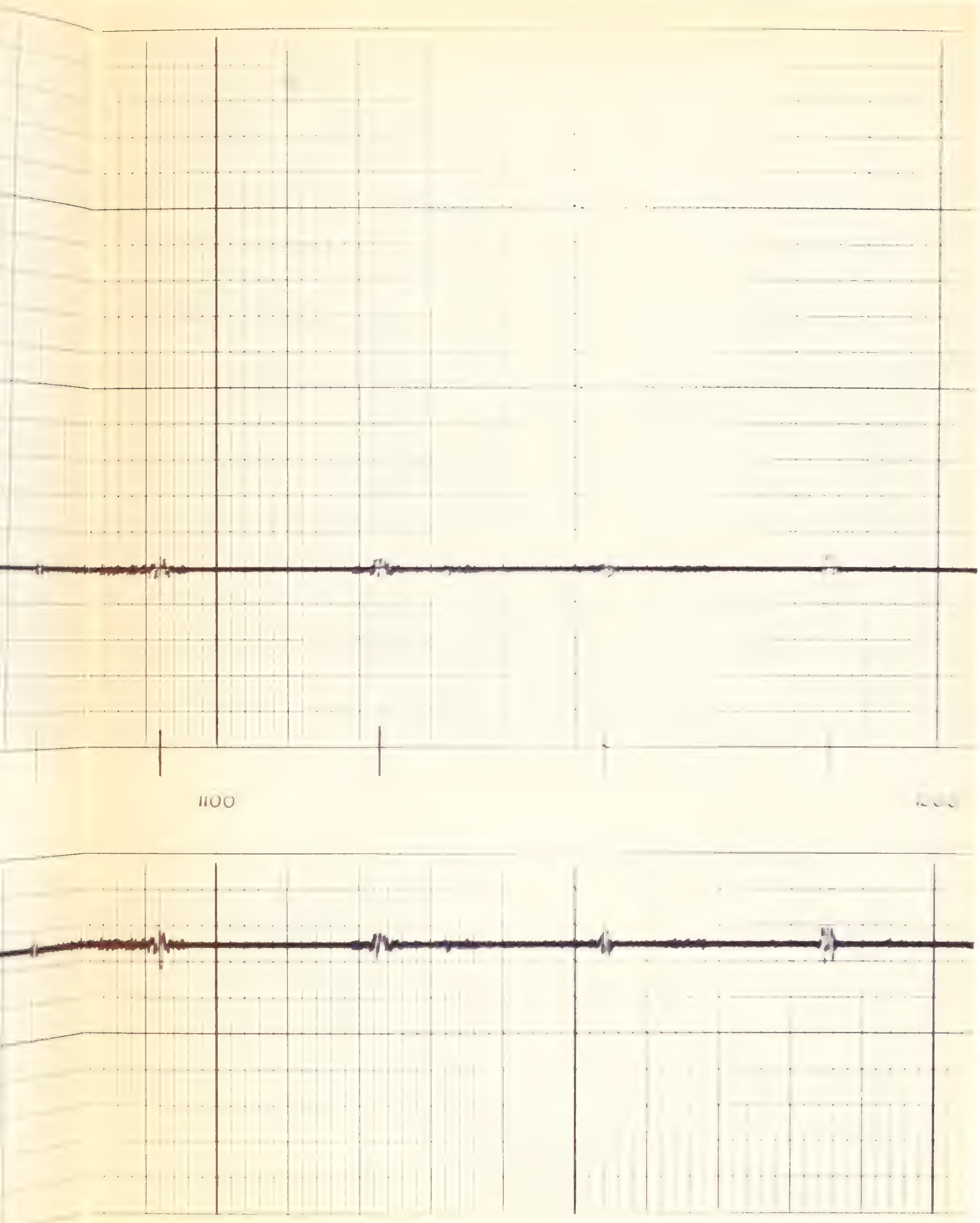
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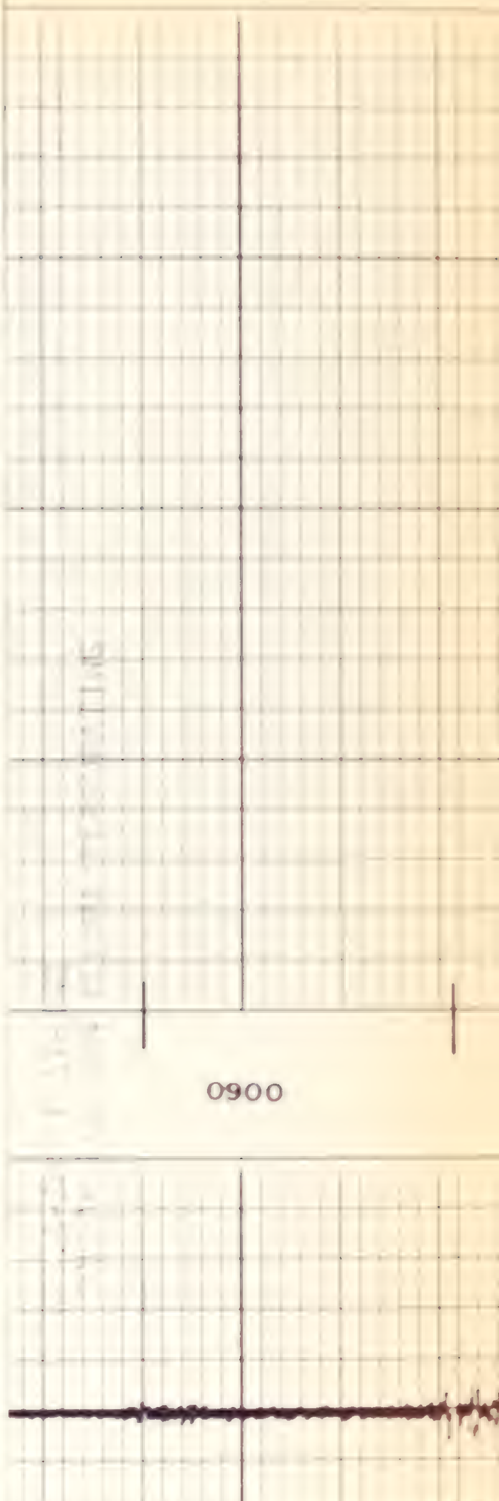
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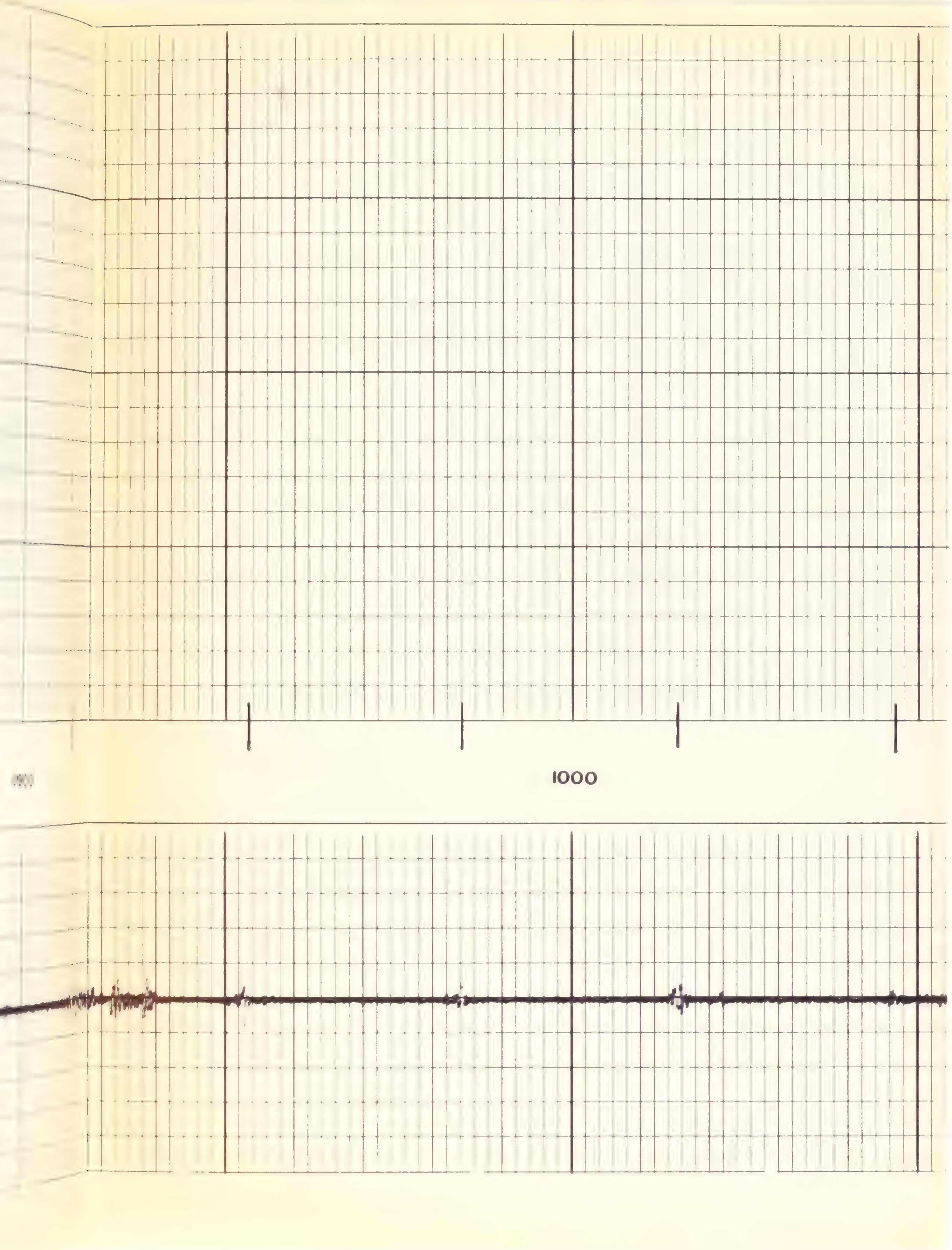
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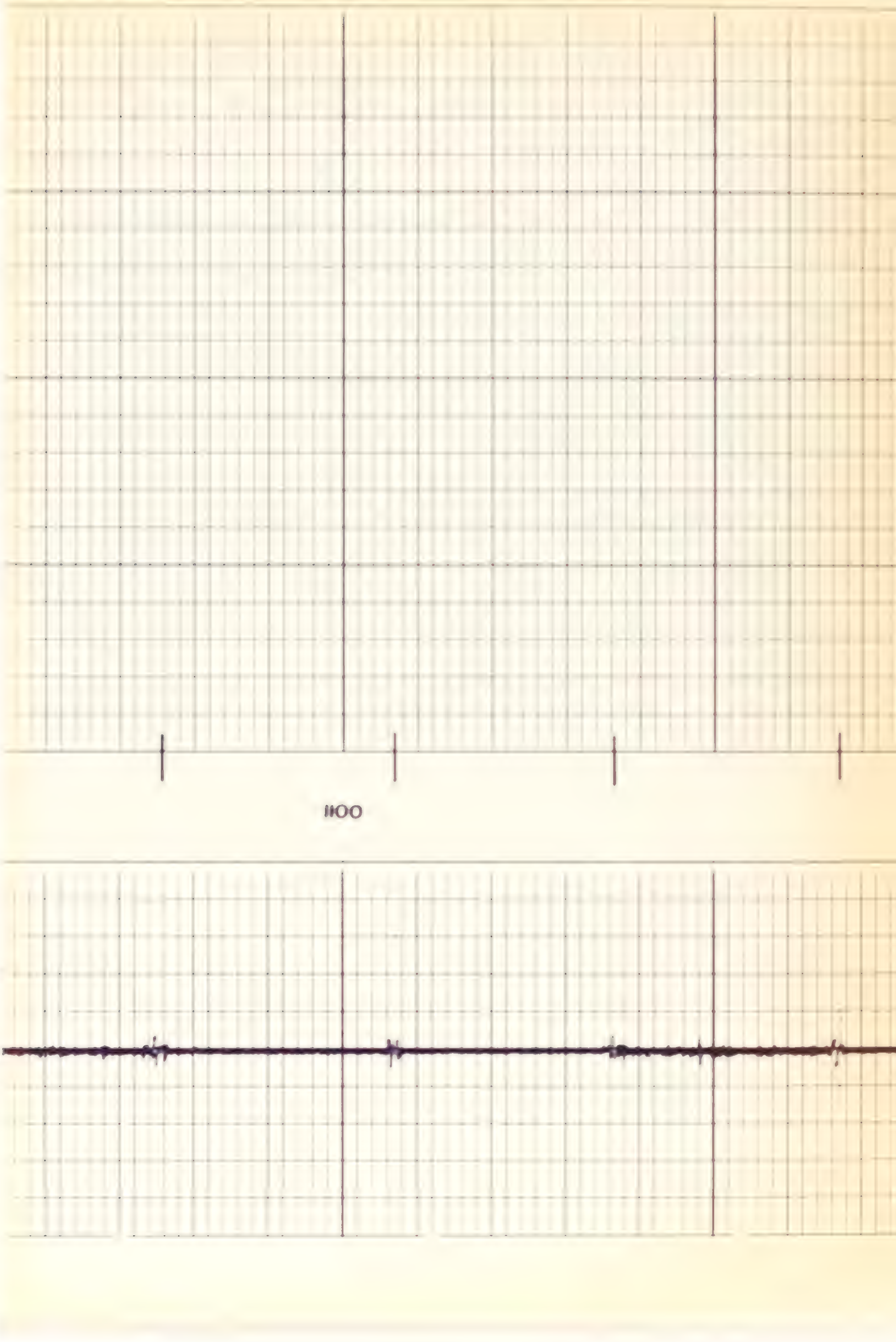
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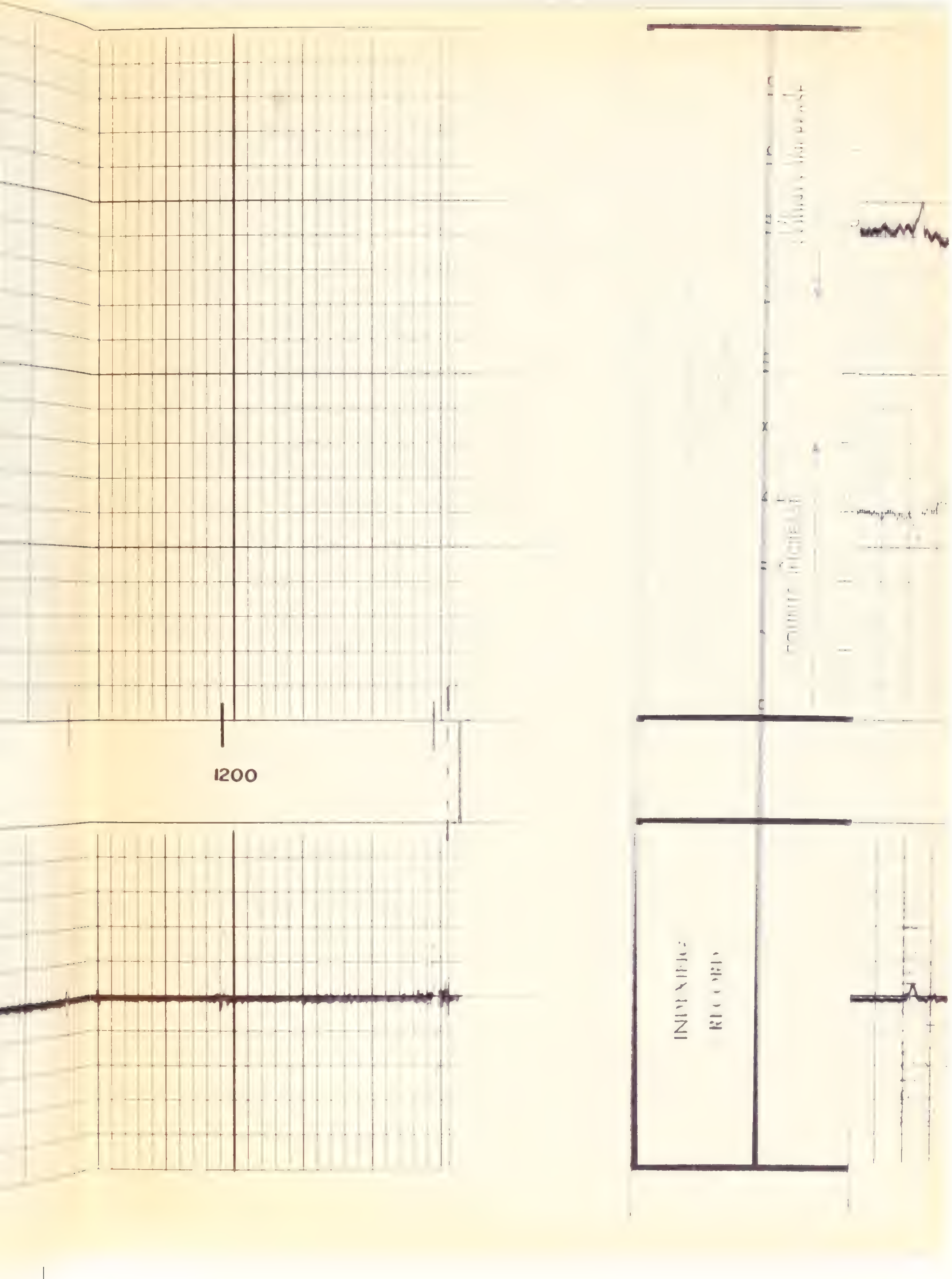
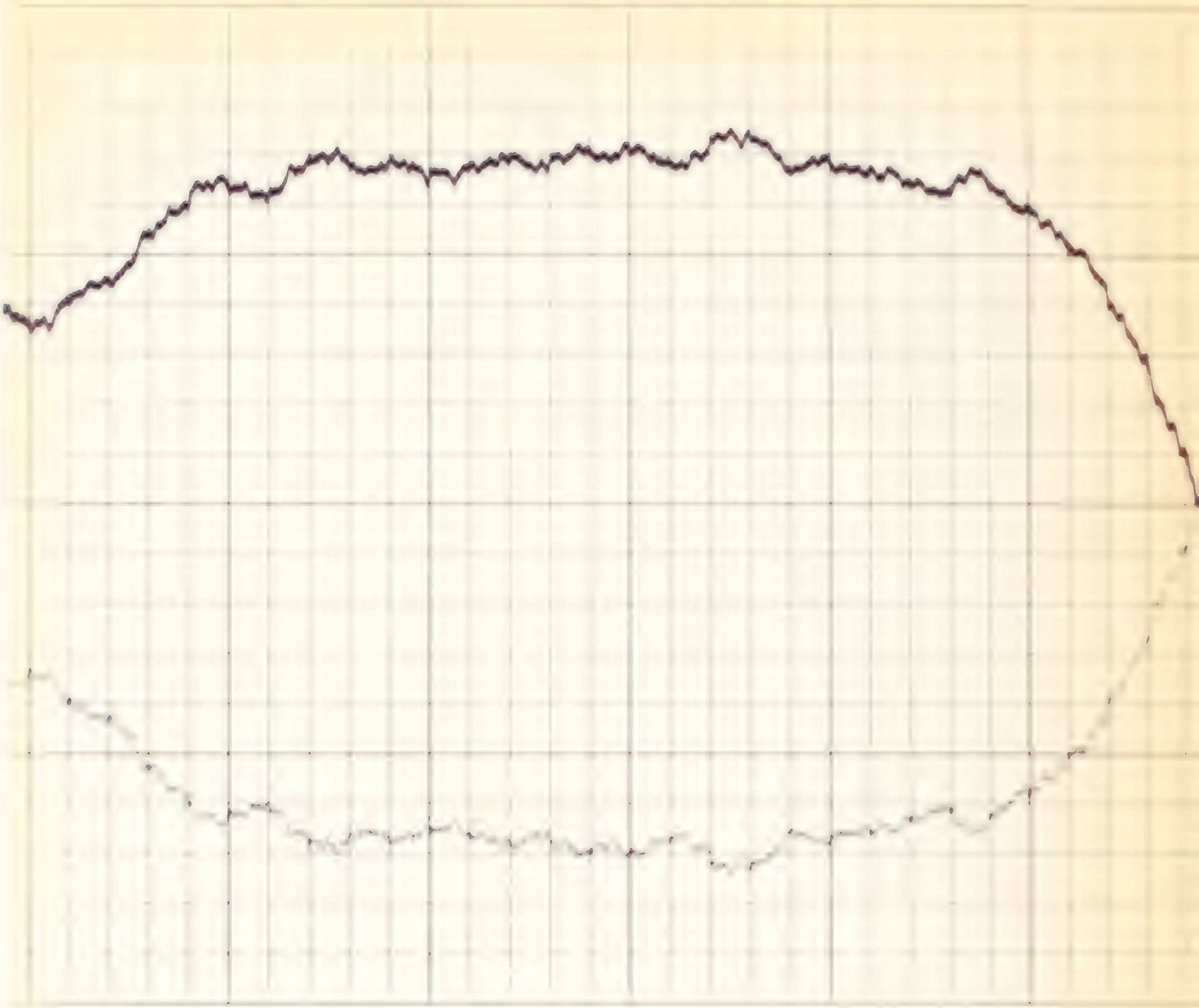
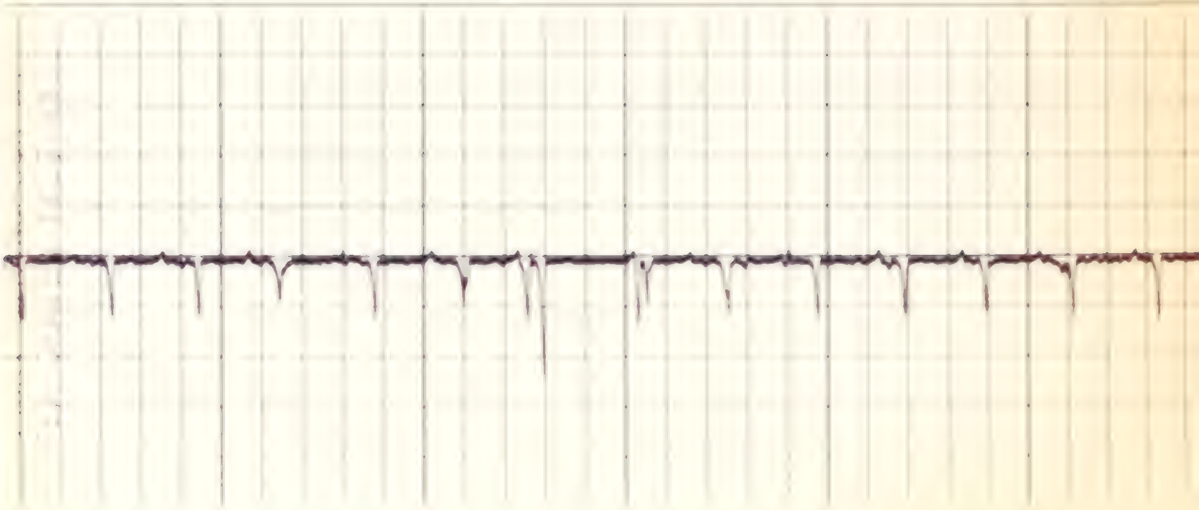
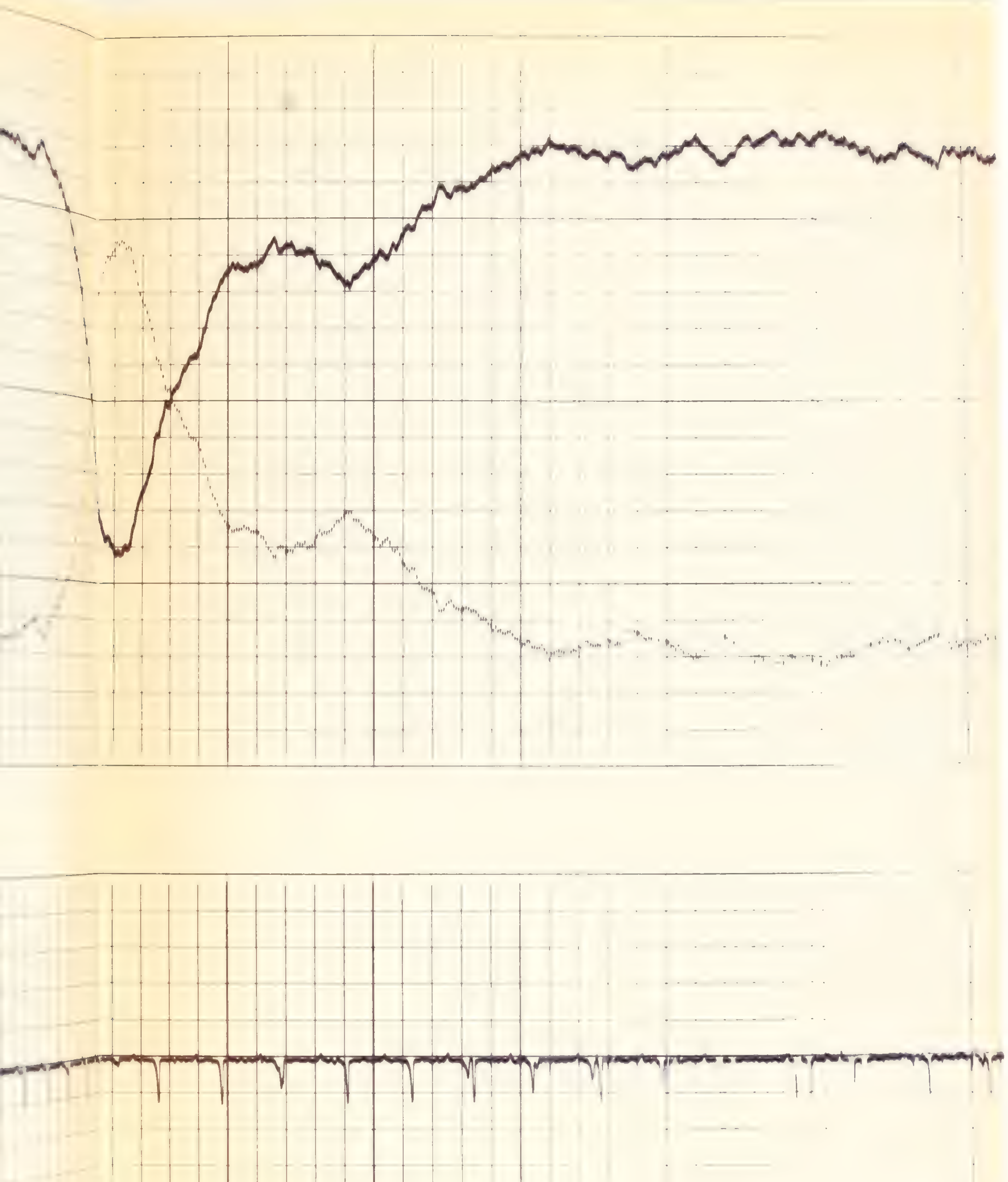
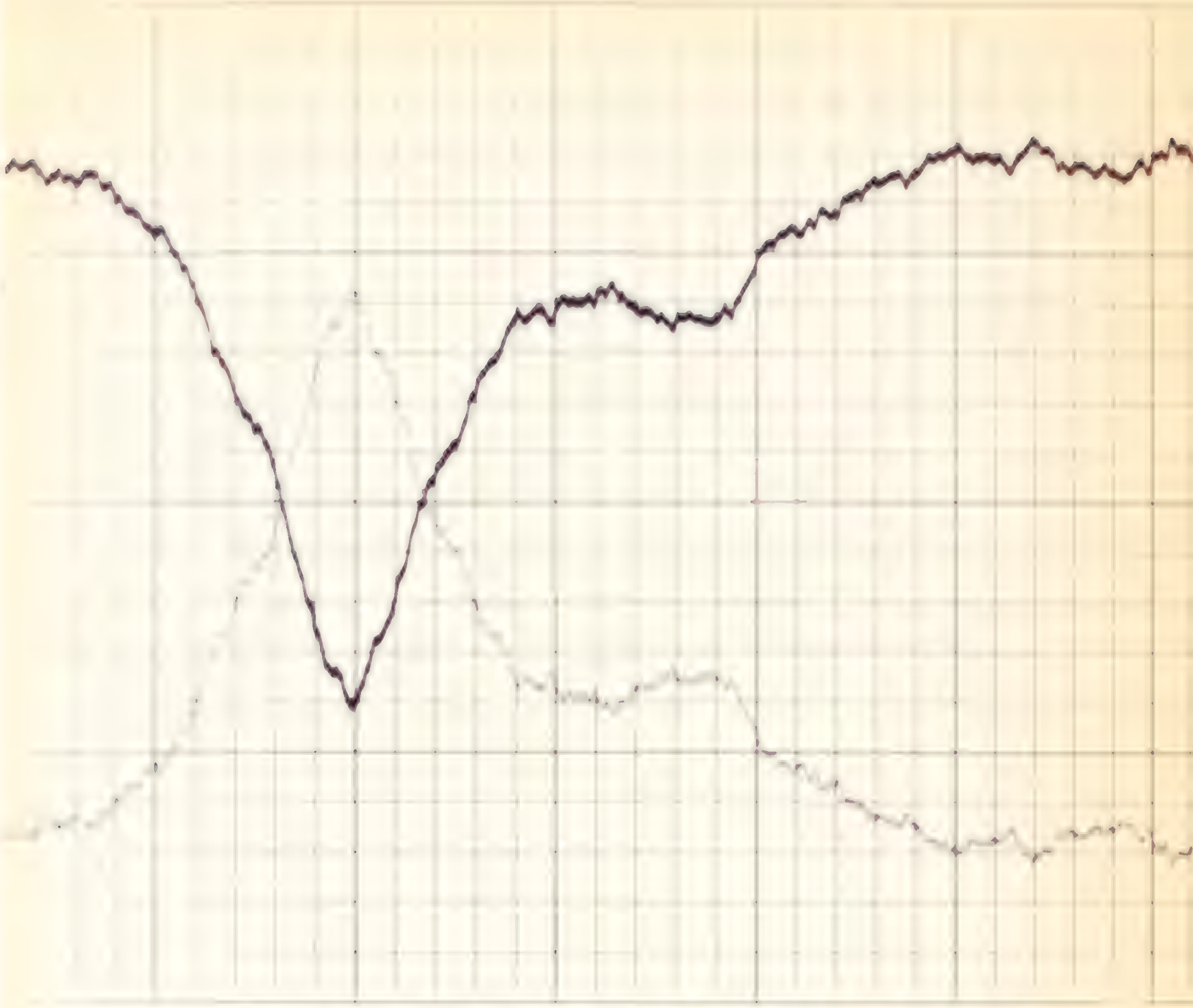
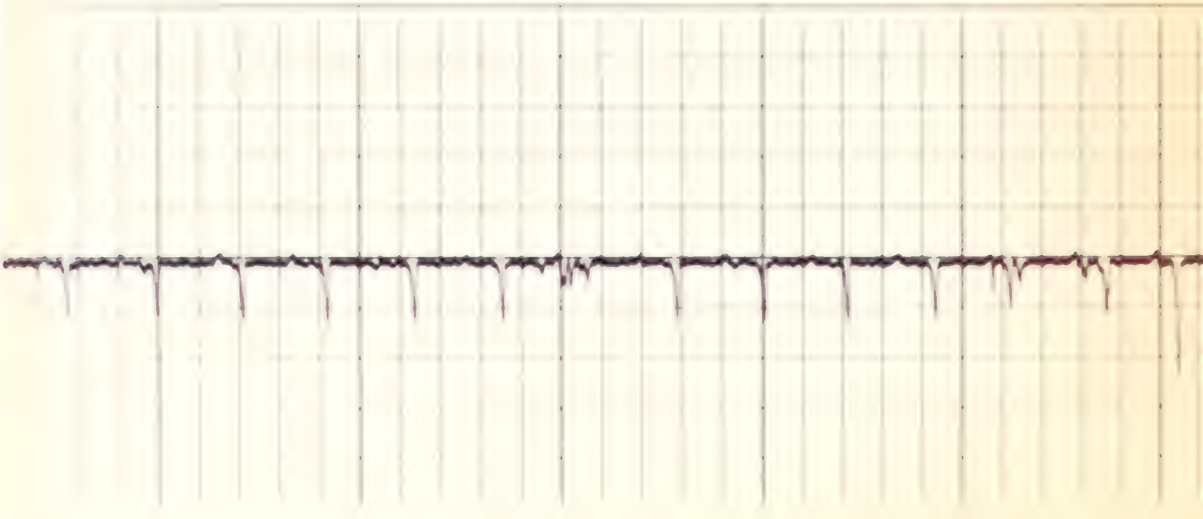

1200
INDENTING RECORD
POUNDS INCREASE

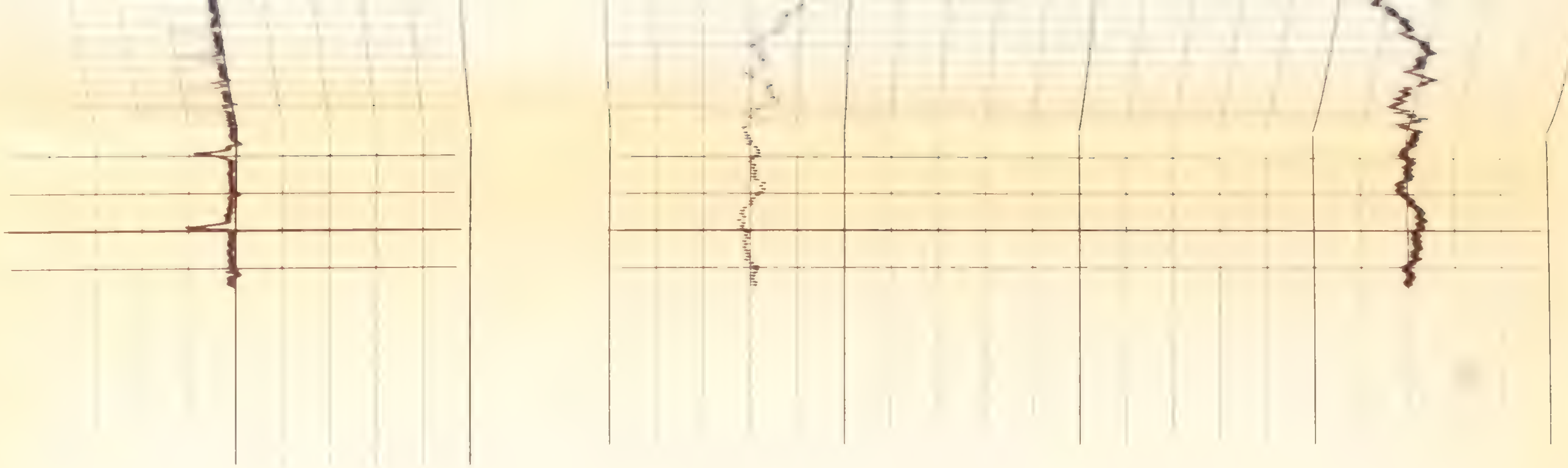




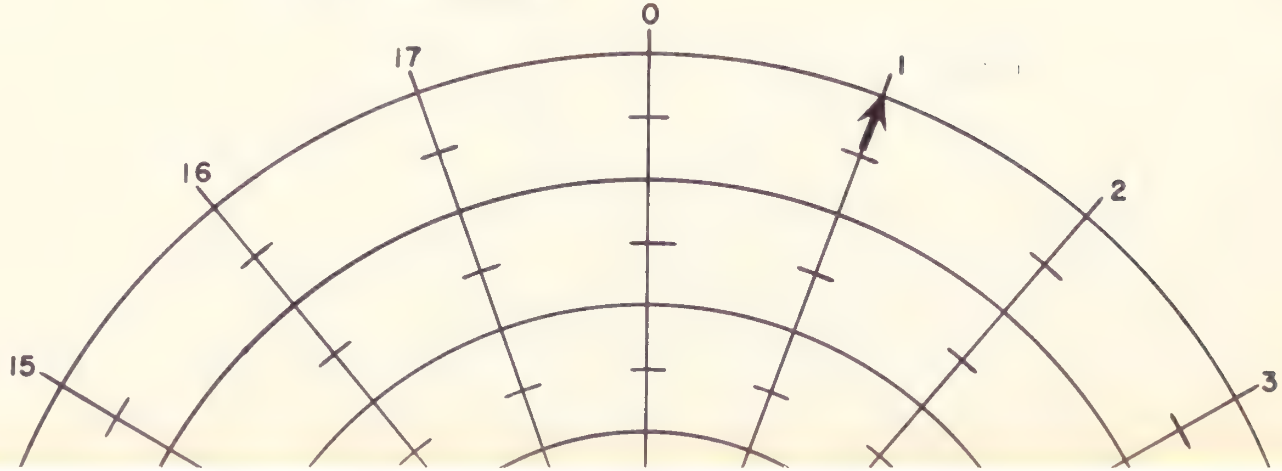


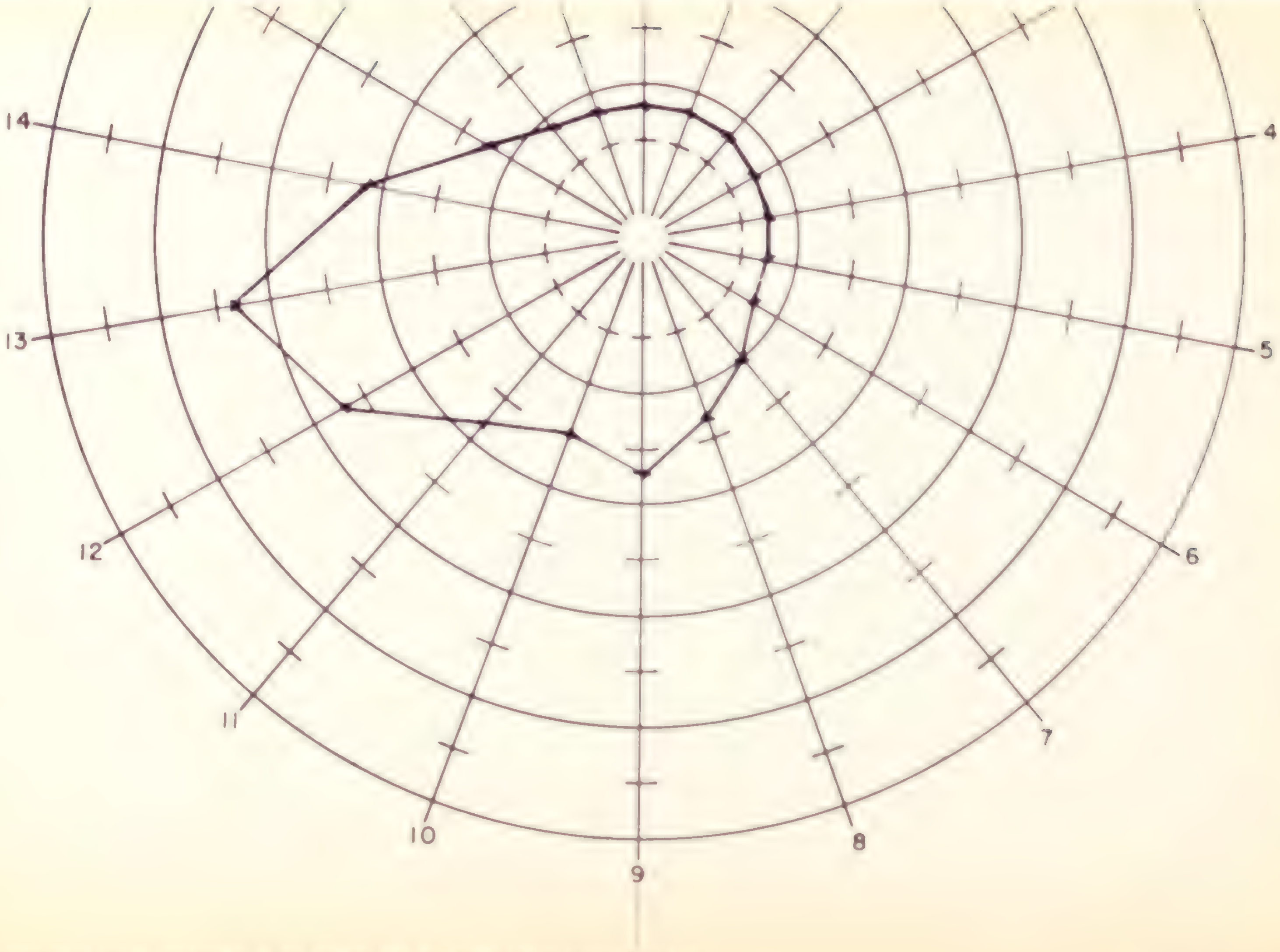






RADIORIENTATION PLOT
POT-B





[illegible]

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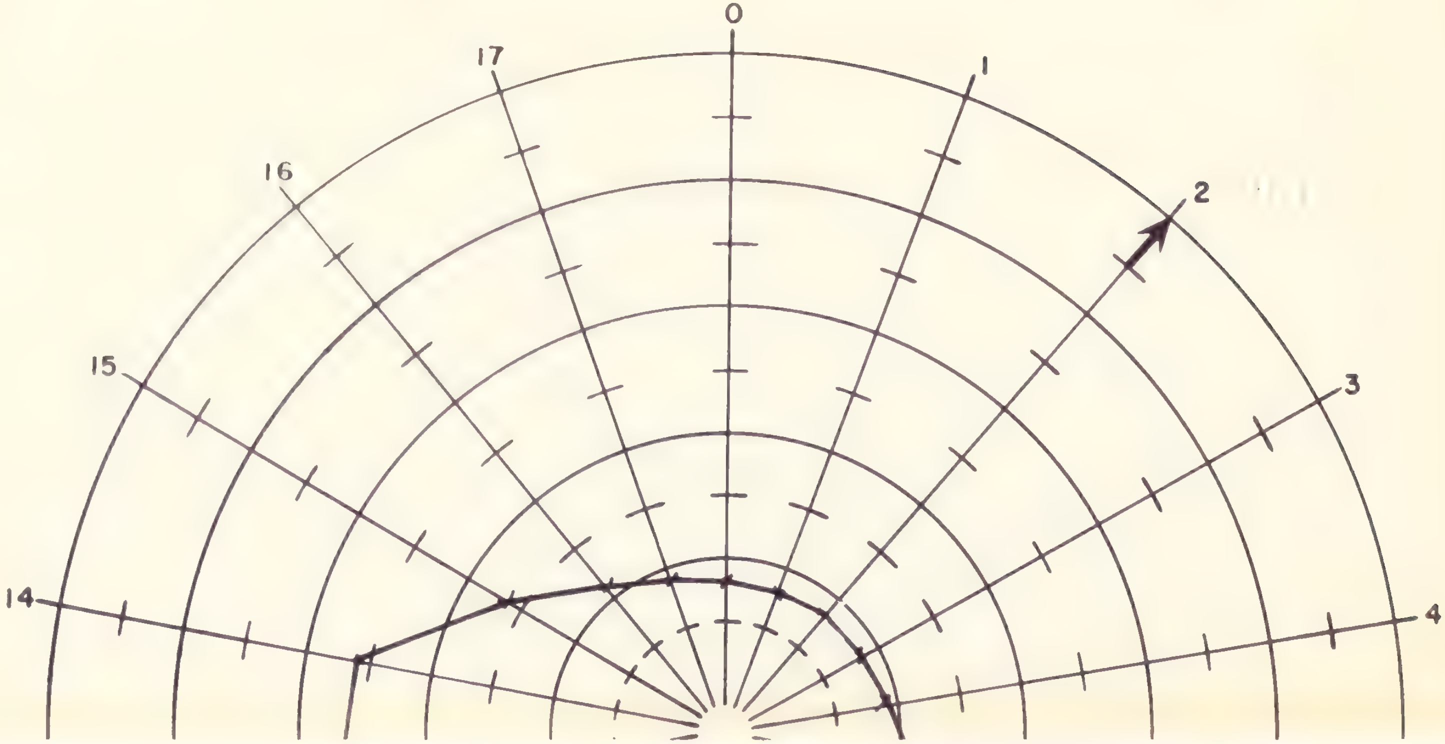
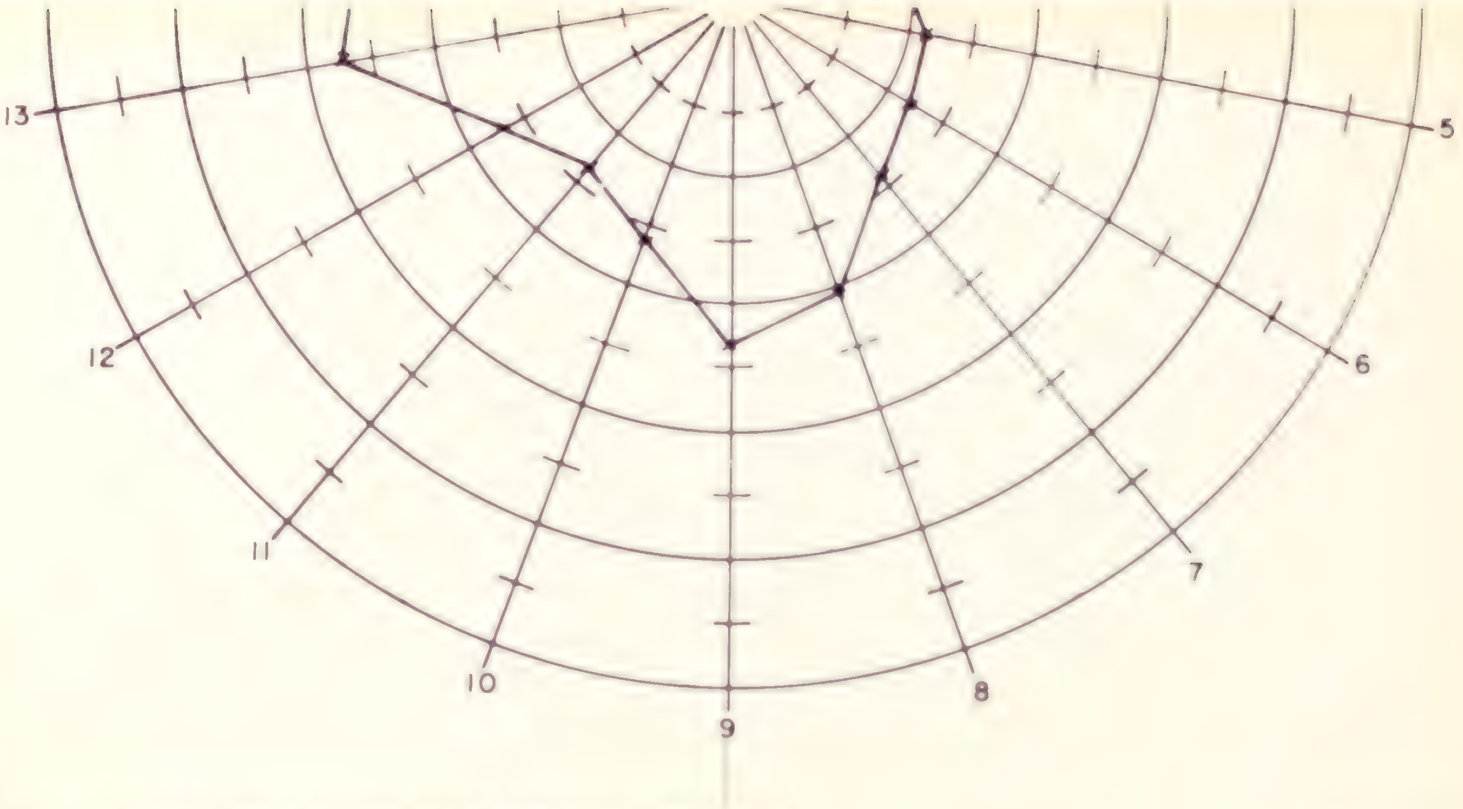
RADIORIENTATION PLOT

POT-B



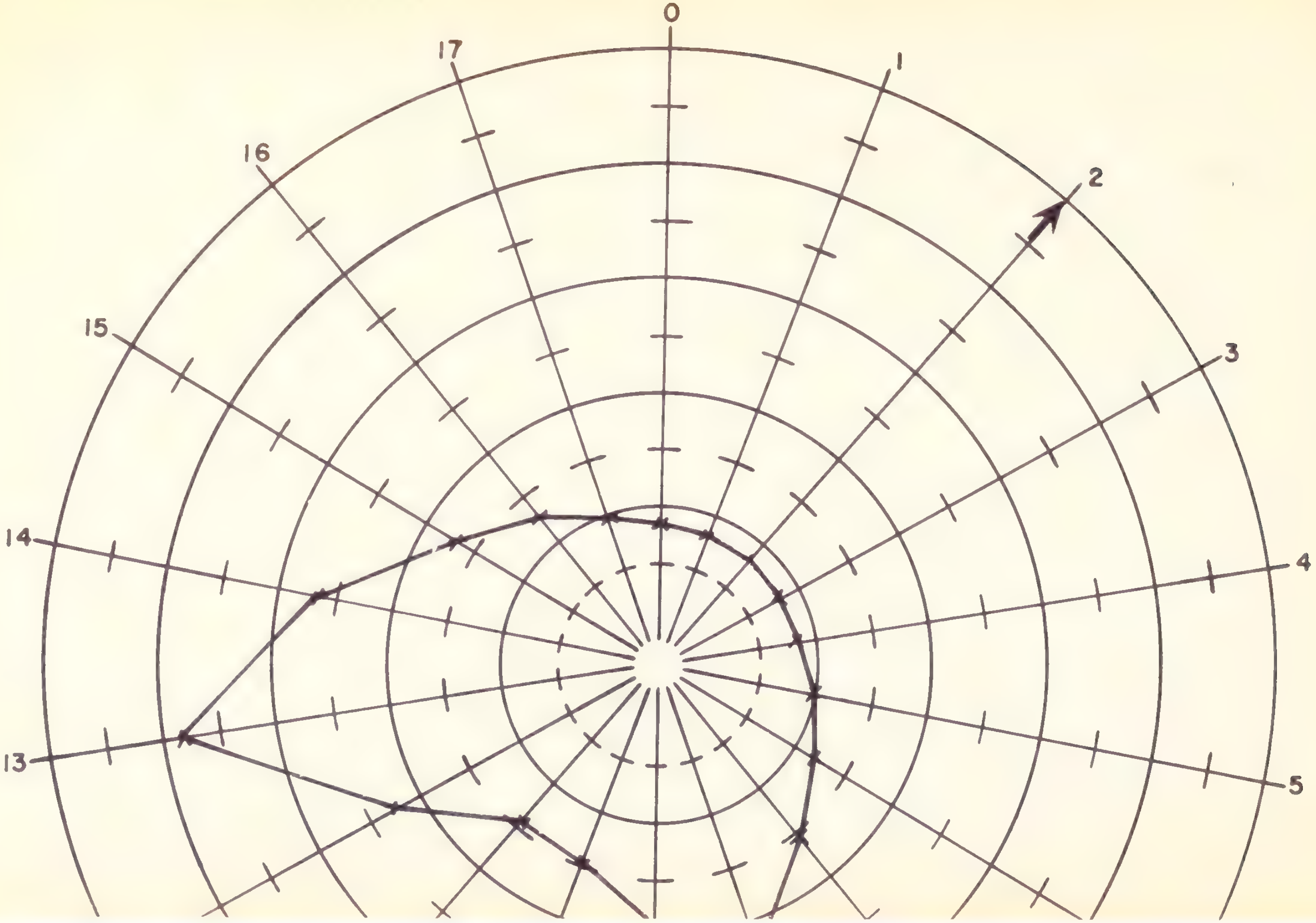


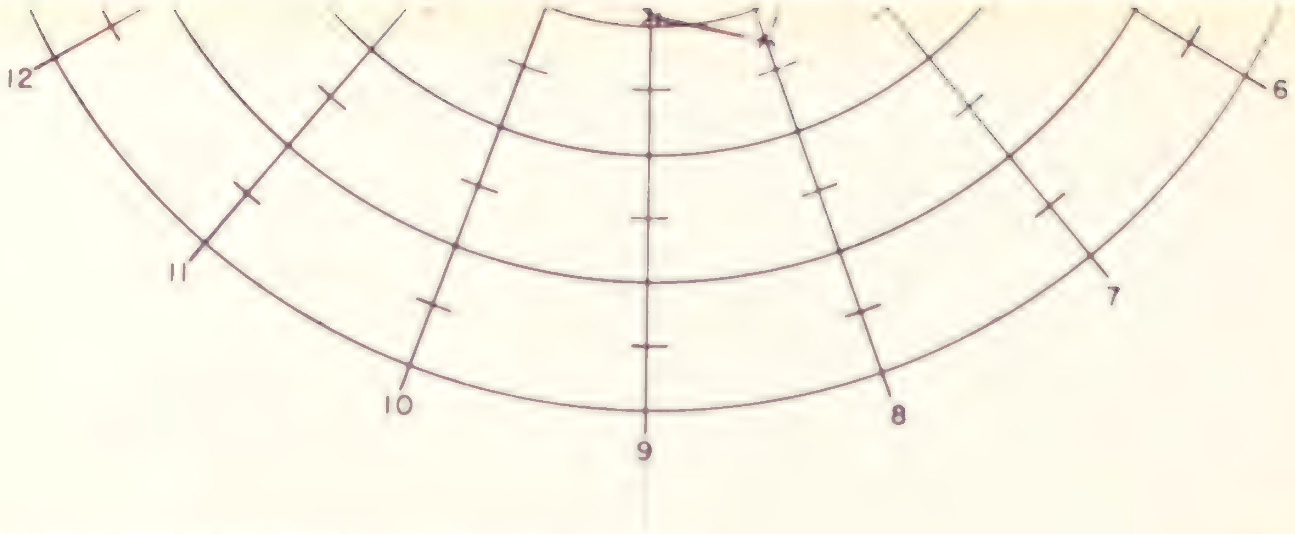
This chart, [illegible]

Schlumberger

RADIORIENTATION PLOT

POT-B



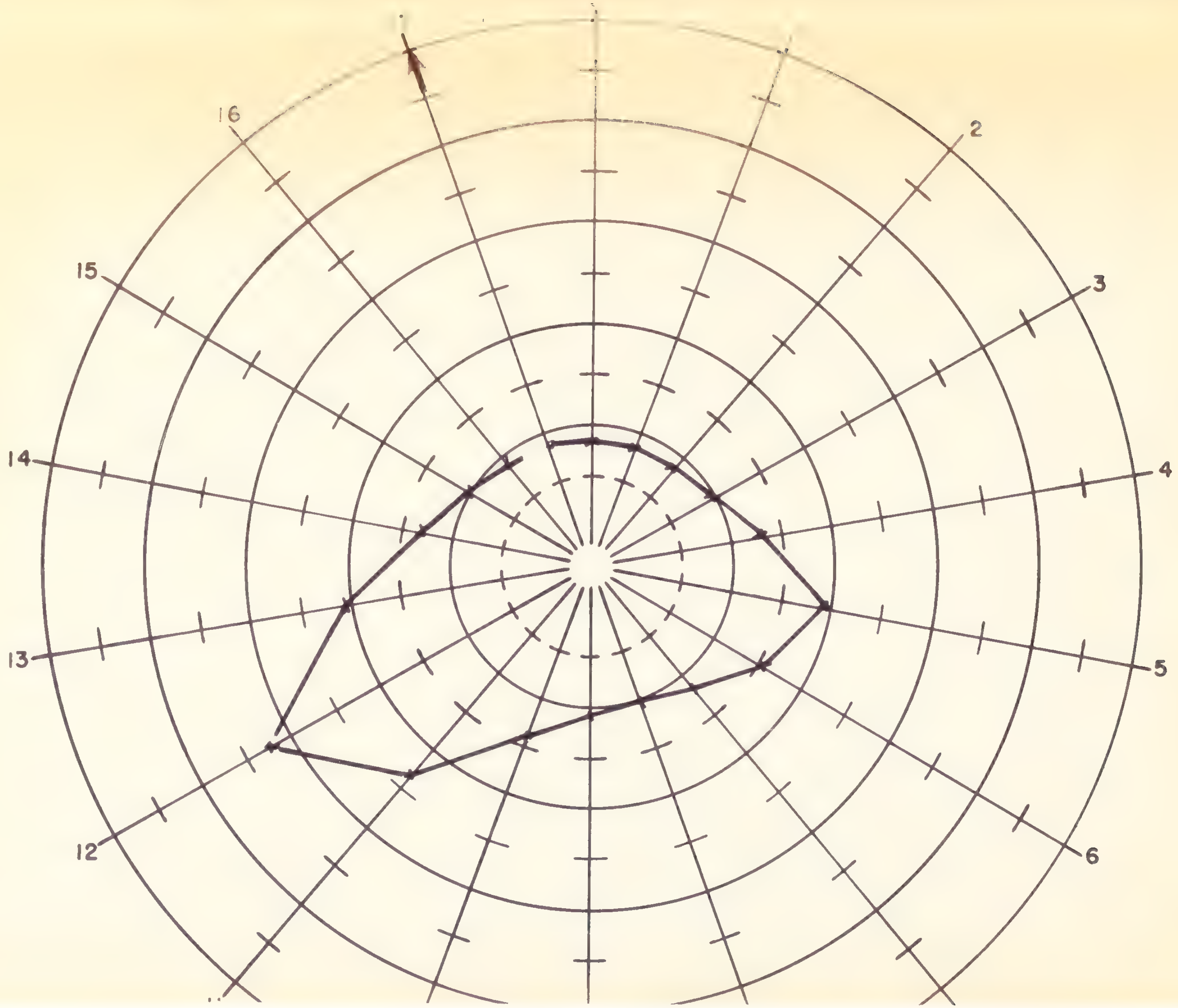


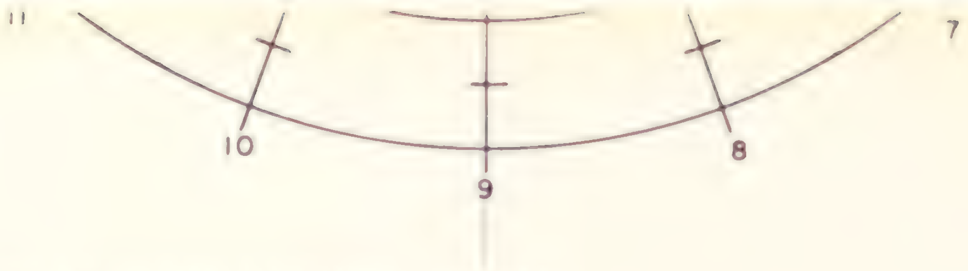
[illegible]

Schlumberger

RADIORIENTATION PLOT

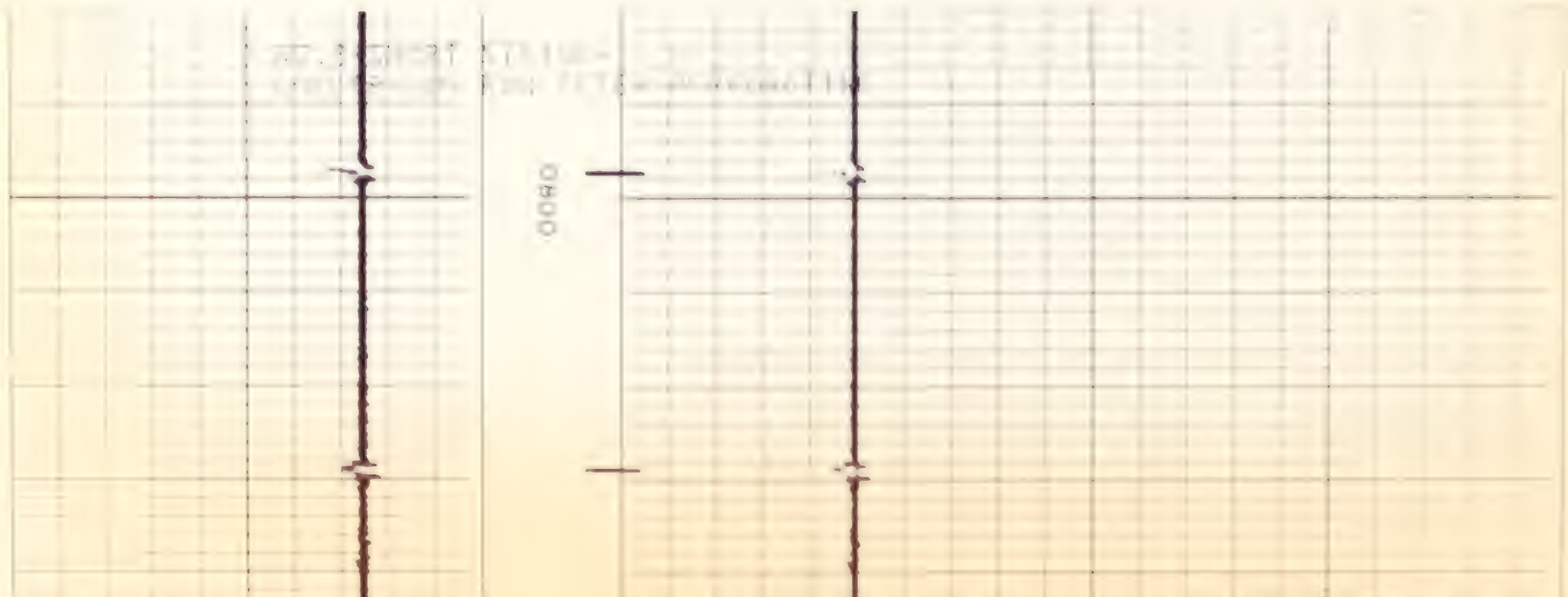
TYPE D

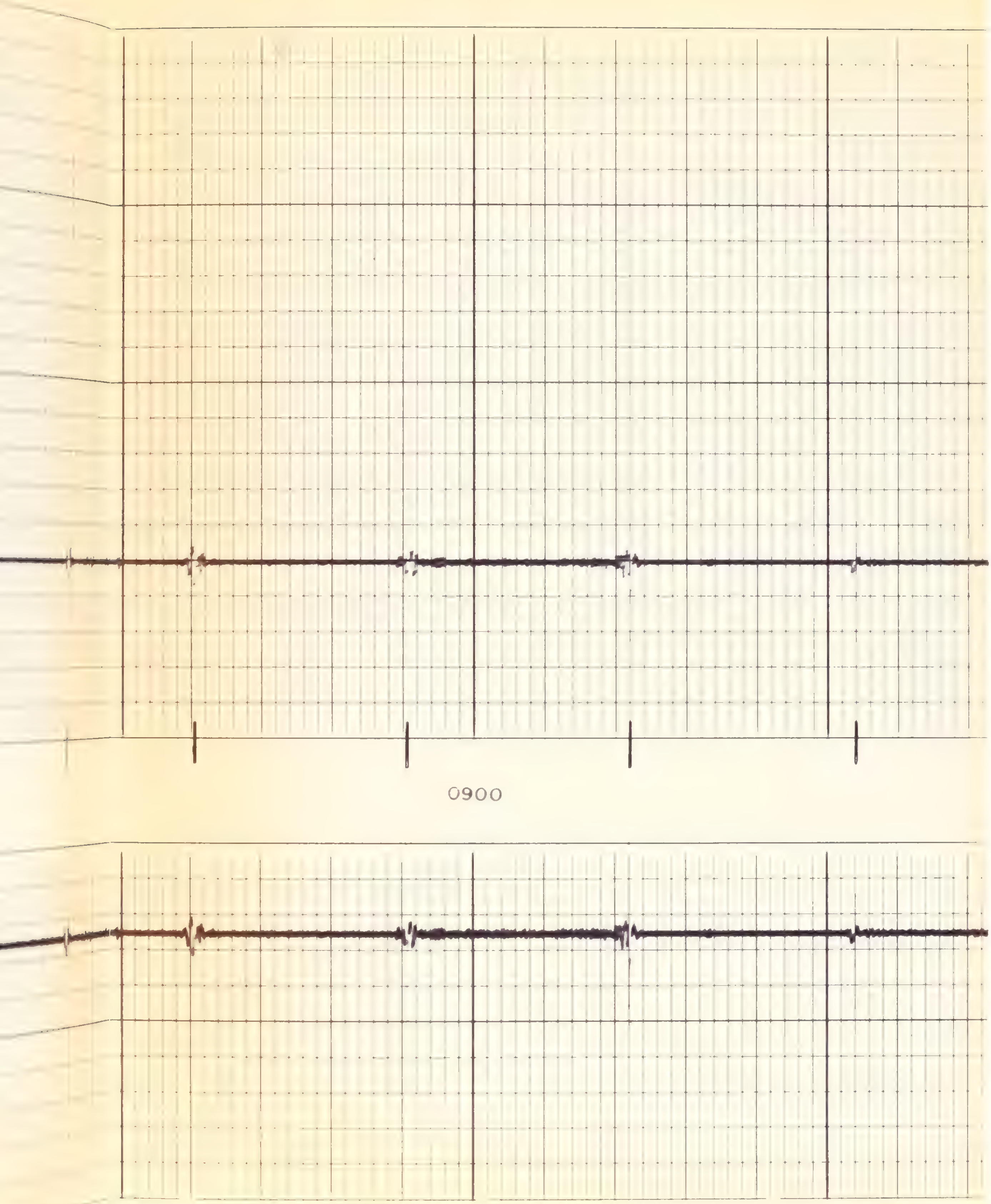

16
2
15
3
14
4
13
5
12
6



This chart [illegible]

Schlumberger

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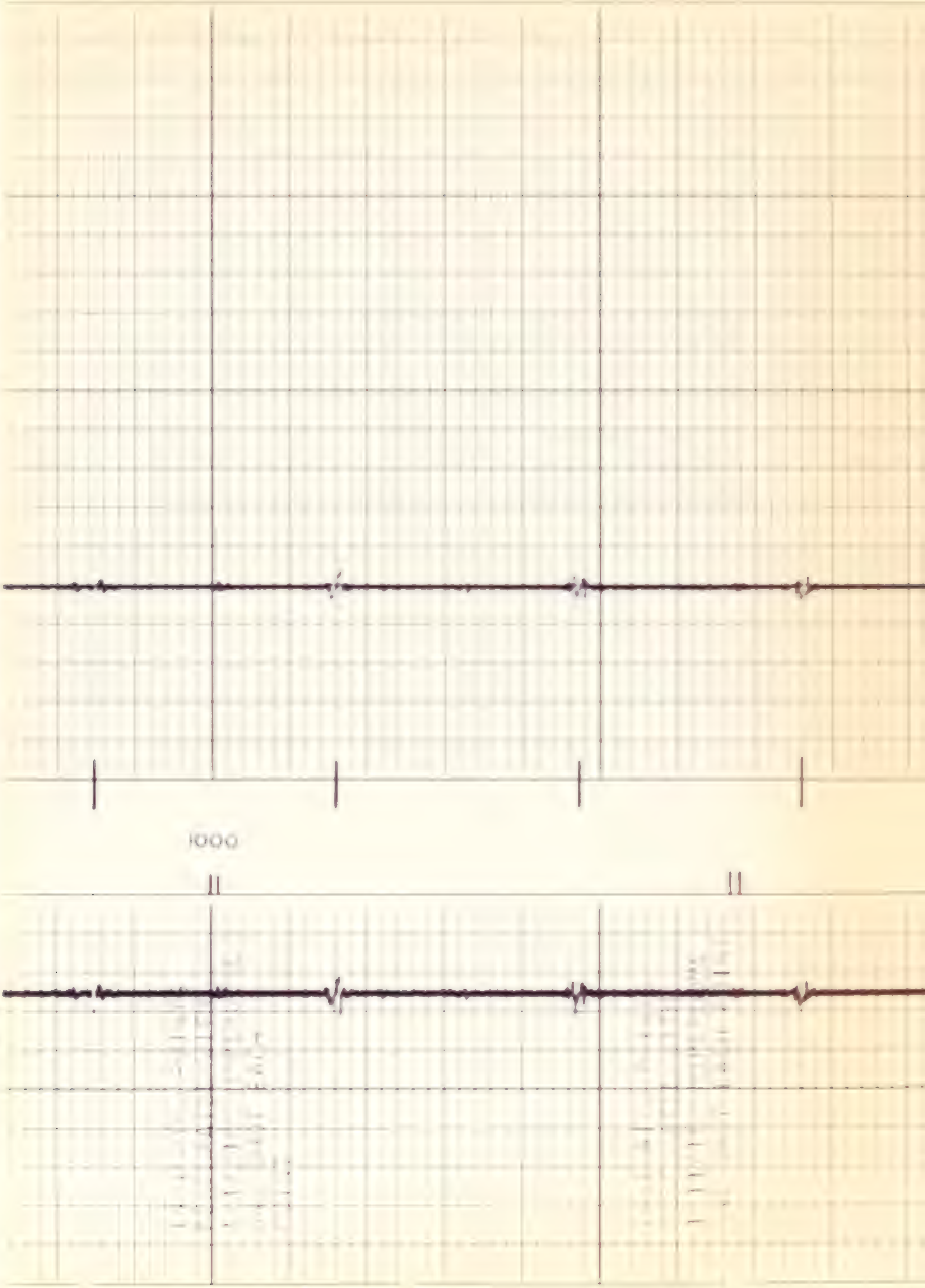
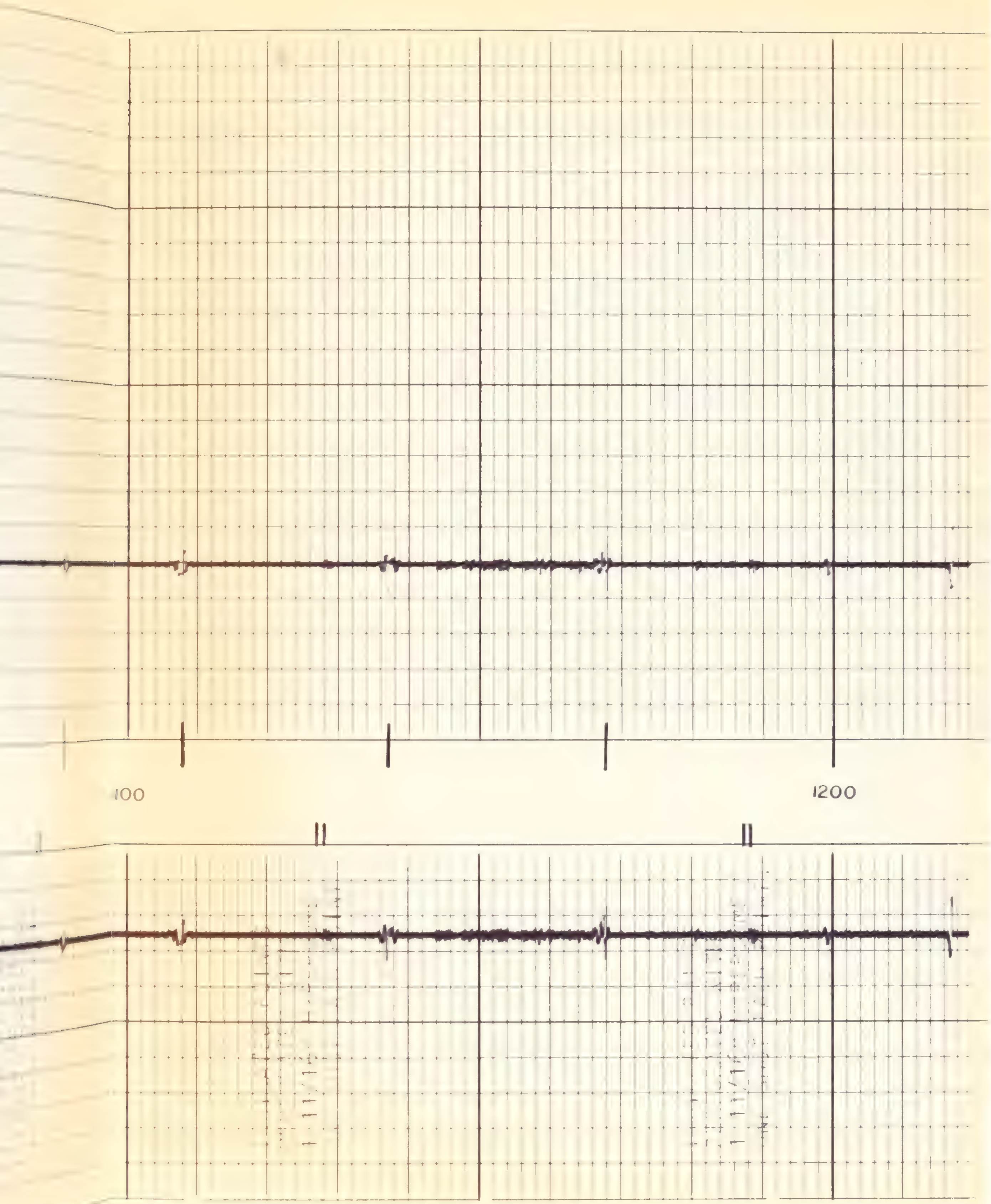

1000
II
II


100
1200
II
II

COMPANY

WELL

FIELD

Schlumberger

PRODUCTION LOGGING SERVICES

Schlumberger

CEMENT BOND LOG

GR-CCL-VDL

COUNTY RIO BLANCO
Field or LOCATION
WELL AT-1C
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL AT-1C

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.

Sec. 7 Twp. 3S Rge. 96W

Other Services:
ORP-HD

Permanent Datum: GROUND LEVEL, Elev. 6909
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6909

Date	9-18-74	Type Drill Fluid	WATER
Run No.	ONE/TWO/THREE	Fluid Level	FULL
Depth — Driller	1638/1528/1373	Max. Rec. Temp.	°F
Depth — Logger	1636/1530/1375	Est. Cement Top	1010
Btm. Log Interval	1628/1522/1367	Equip. | Location	3862 | VERNAL
Top Log Interval	900/ 900/ 880	Recorded By	ST. AUBYN
Open Hole Size	7 7/8	Witnessed By	ROSS/ELLARD

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8			T-C	SURF	60
String (1)	2 3/8	4.7		T-C	SURF	1643
String (2)	2 3/8	4.7		T-C	SURF	1528
STRING (3)	2 3/8	4.7		T-C	SURF	1373

PRIMARY CEMENTING DATA

STRING	Surface	STRINGS ONE, TWO AND THREE		
Vol. of cement		120 SKS.		
Type of cement		HOWCO LT. WT.		
Additive		10#/SK- GILSONITE		
		0.3% LWL		
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

PRIMARY CEMENTING PROCEDURE	Haur — date	Hours from start of operation
Started pumping cement		
Release pressure	16:18 9-11-74	
Start Cement Bond Log	12:00 9-18-74	
Finish Cement Bond Log	17:00 9-18-74	

REMARKS
Service Order No. 49924
Csg. Collars Recorded 19 ft. DEEP

Preceding fluid ______ Volume ______ bbls.
Cement pumped ______ bbls./minute

Pipe reciprocated during Pumping: Yes ______ No ______
Pipe reciprocated after plug down: Yes ______ min., No ______

SQUEEZE JOB DETAIL		
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

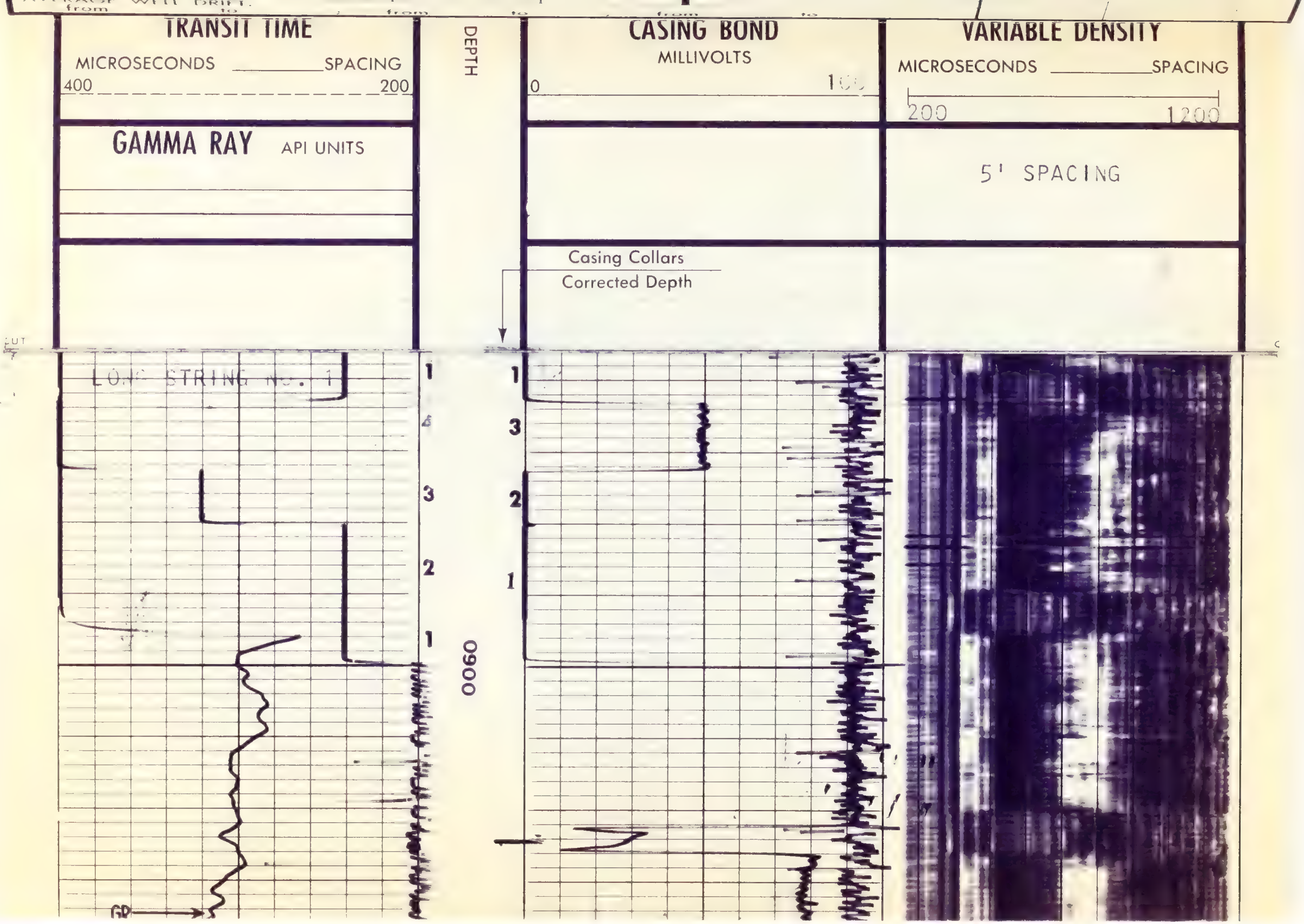
AVERAGE WELL DRIFT:
from ______ to ______ ; from ______ to ______ ; from ______ to ______

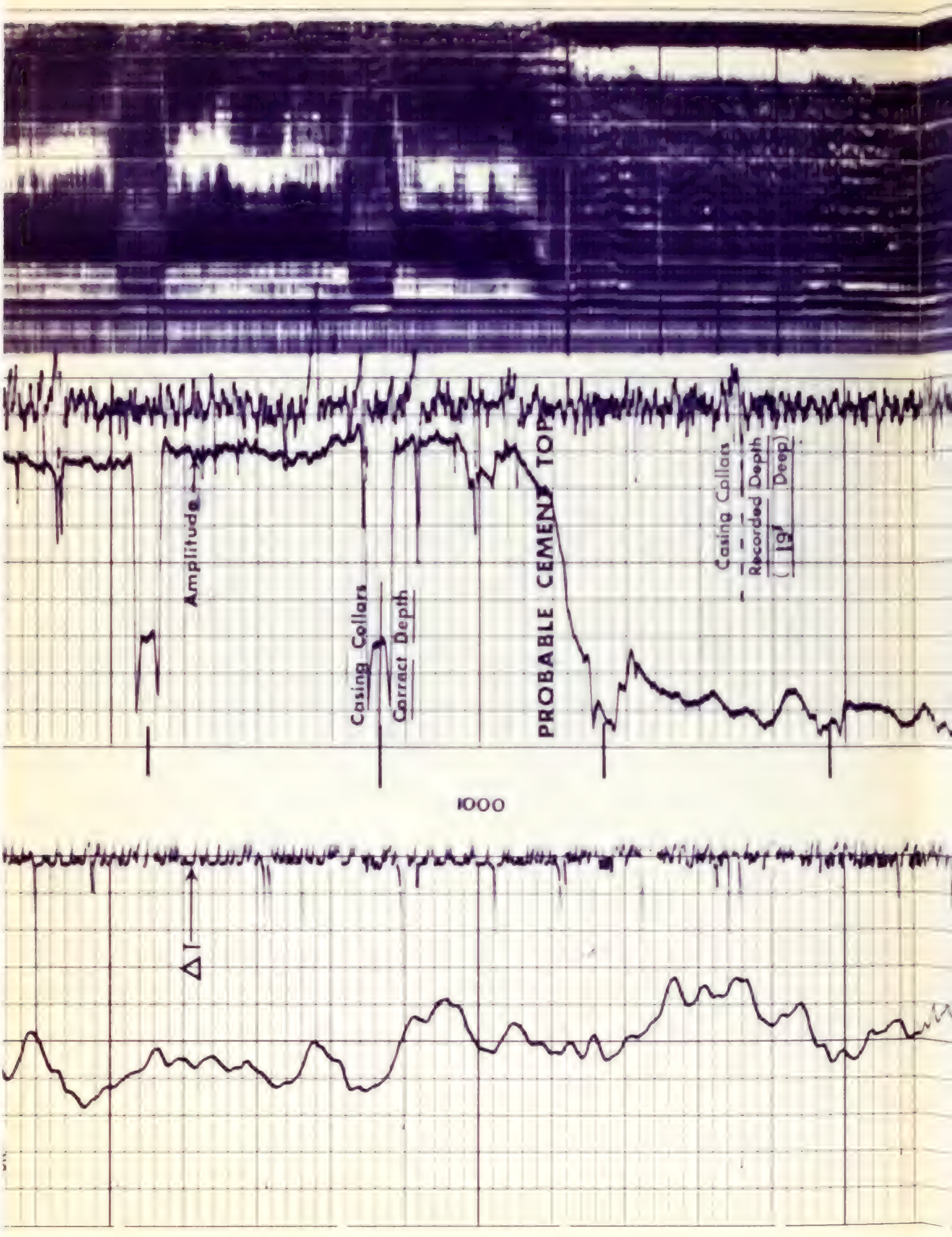
EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SL5-FF#08	
Sonic Cart No.	SHH-A A#45	
Sonic Sonde No.	SLS-JC#9-	
CRP No.	14	
Mem Panel No.	MMP-SF201	
GR Panel No.	556	
GR Cart No.	SHH-AFA#31	
Centralizer: Type	CME-V CAL-A	
No.	3MEW	
To Level (MV)	100	
Cart. Gain	1/20	
CRP Intensity	.16	
R9G Intensity	[illegible]	
Logging Speed	30 FPM	
Time Constant		

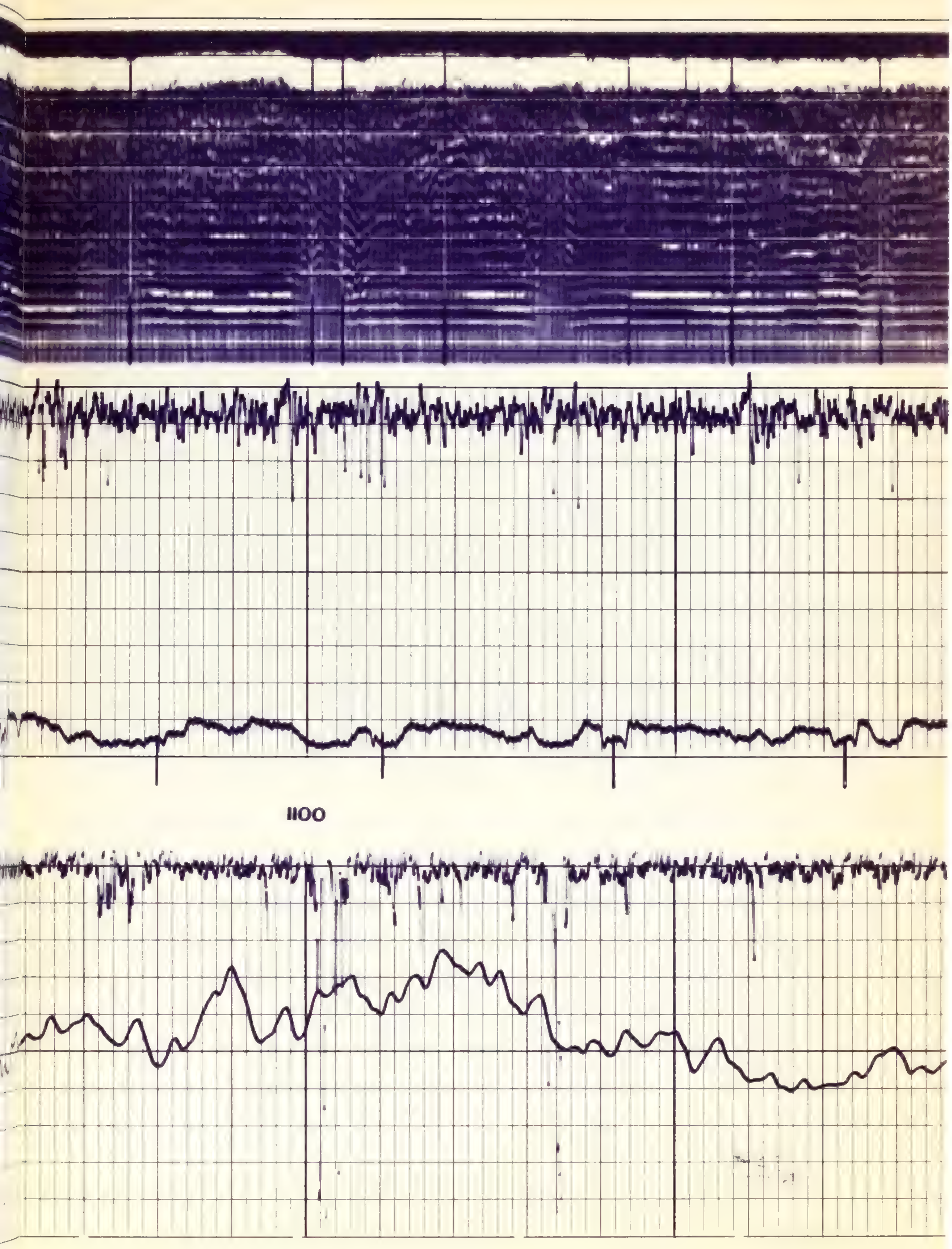
TRANSIT TIME

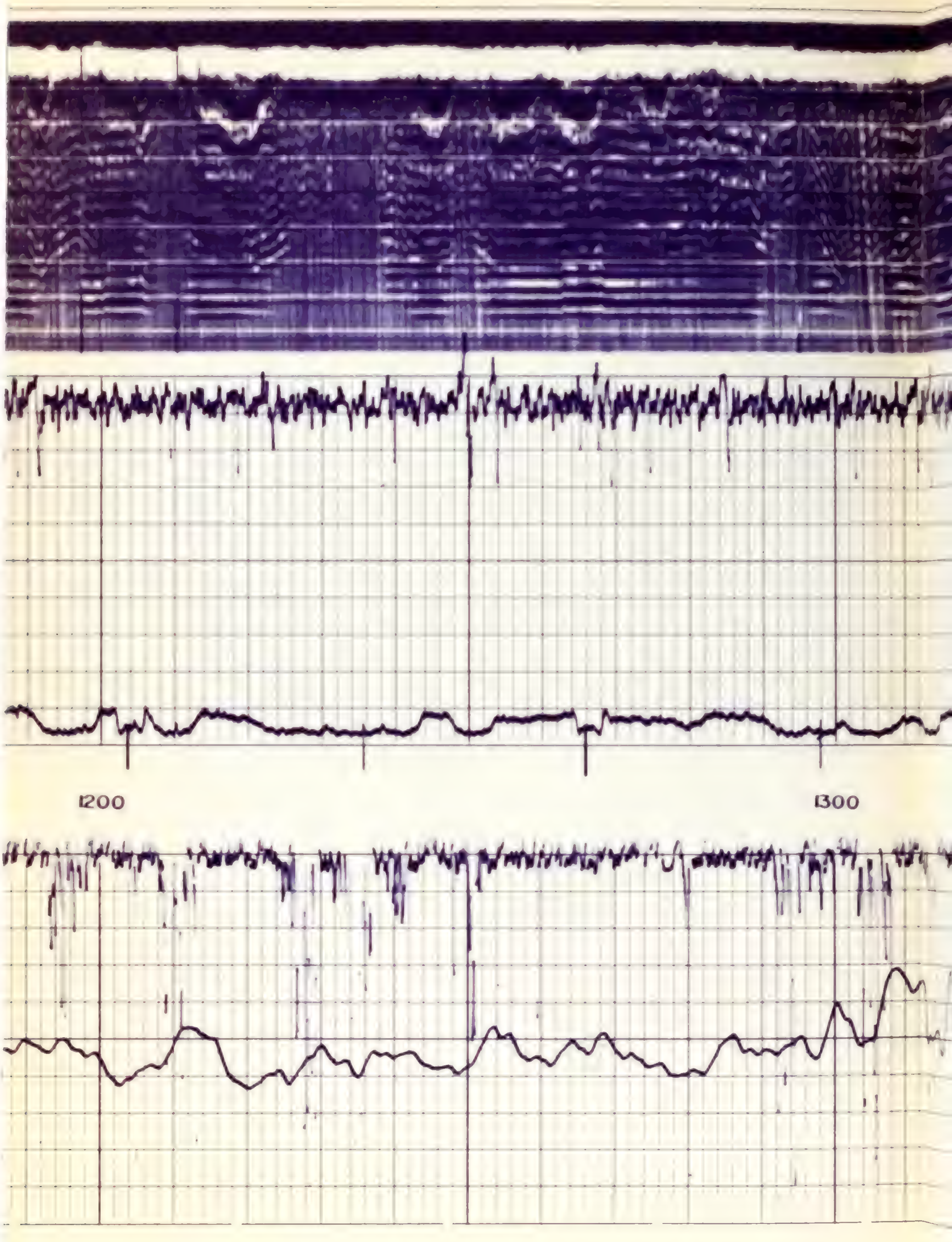
CASING BOND

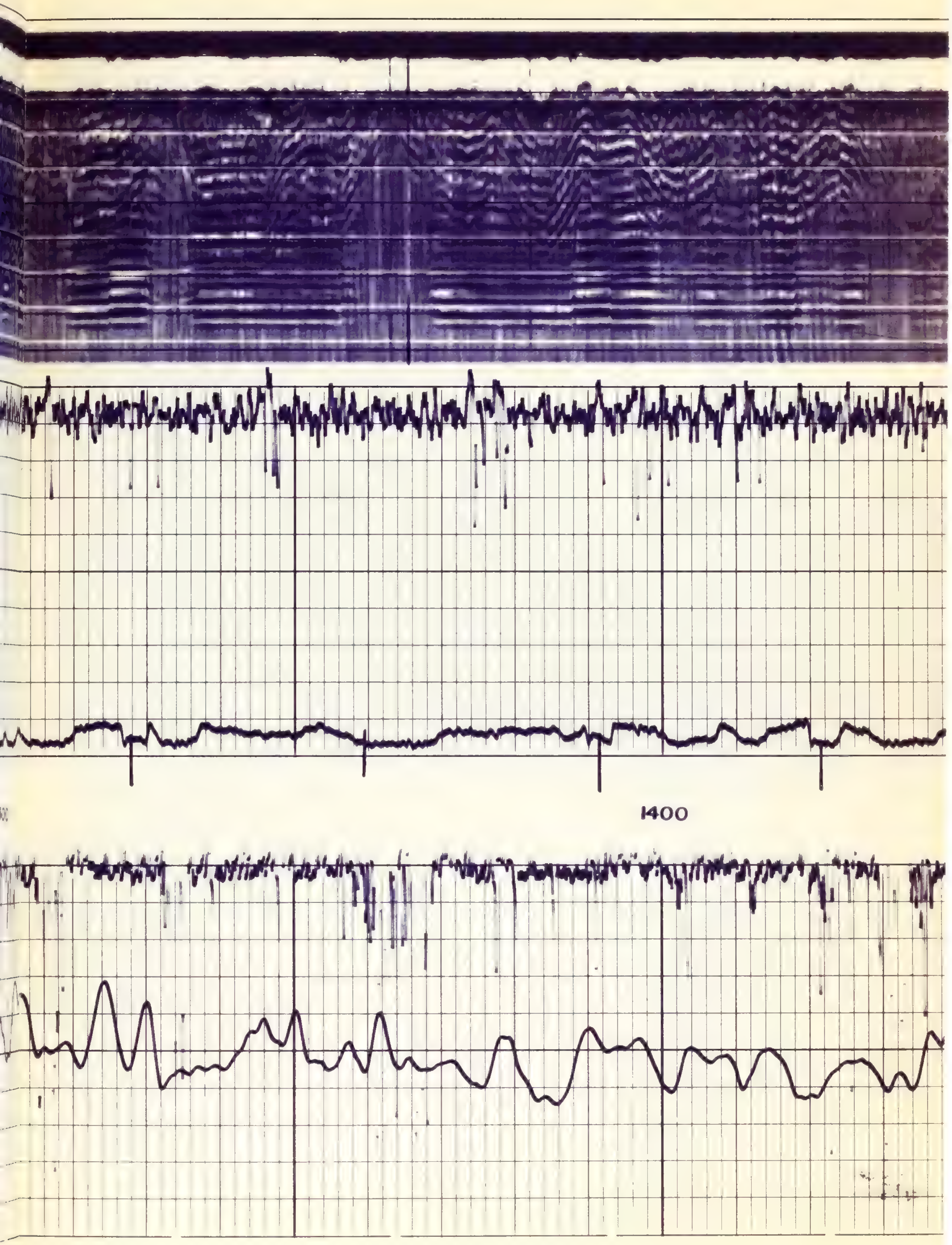
VARIABLE DENSITY

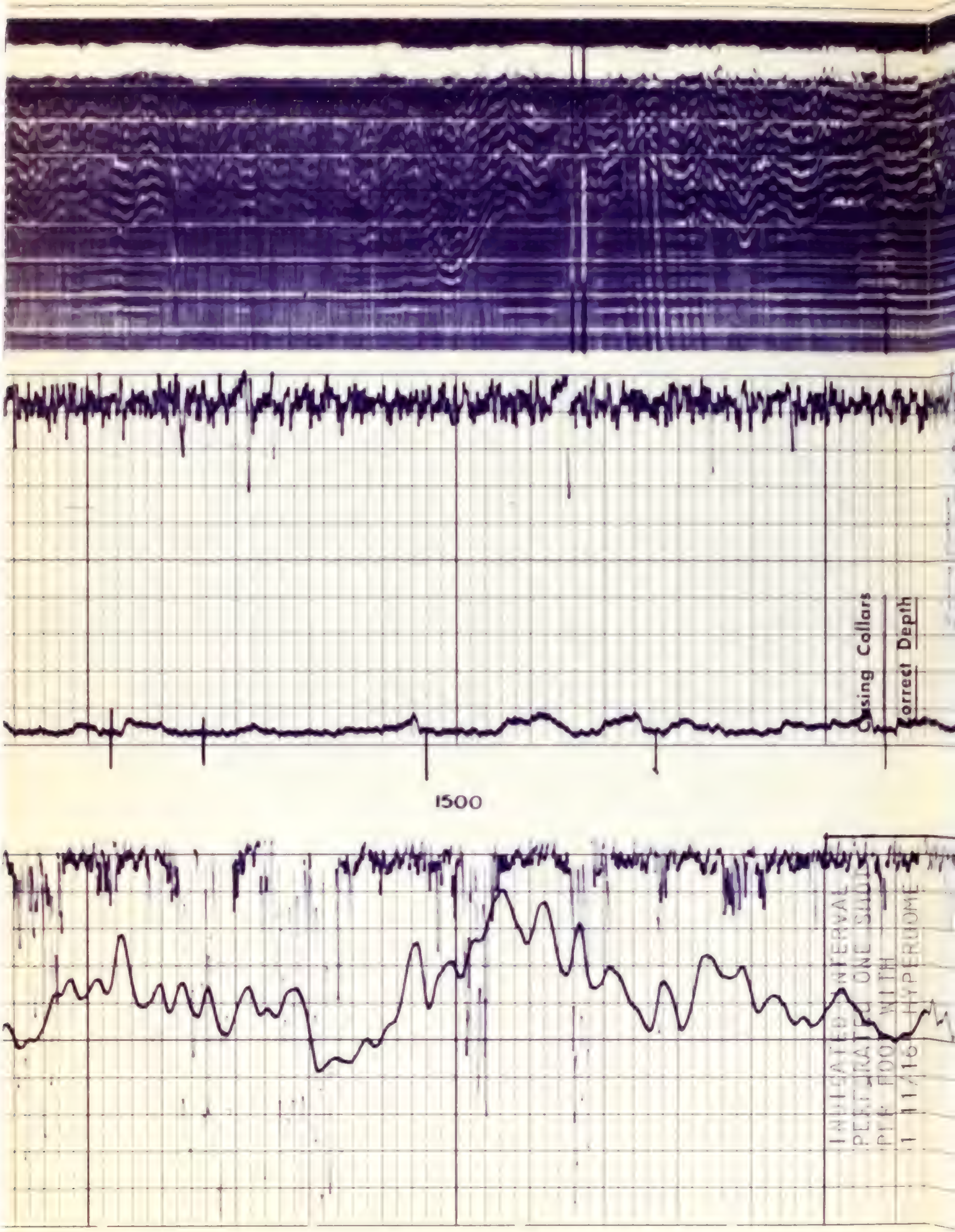

AVERAGE WELL DRIFT: from to from to from to
TRANSIT TIME
MICROSECONDS SPACING
400
200
GAMMA RAY API UNITS
DEPTH
CASING BOND
MILLIVOLTS
0
100
Casing Collars
Corrected Depth
VARIABLE DENSITY
MICROSECONDS SPACING
200
1200
5' SPACING
LONG STRING No. 1
1
4
3
2
1
1
3
2
1
0900
GR
CUT

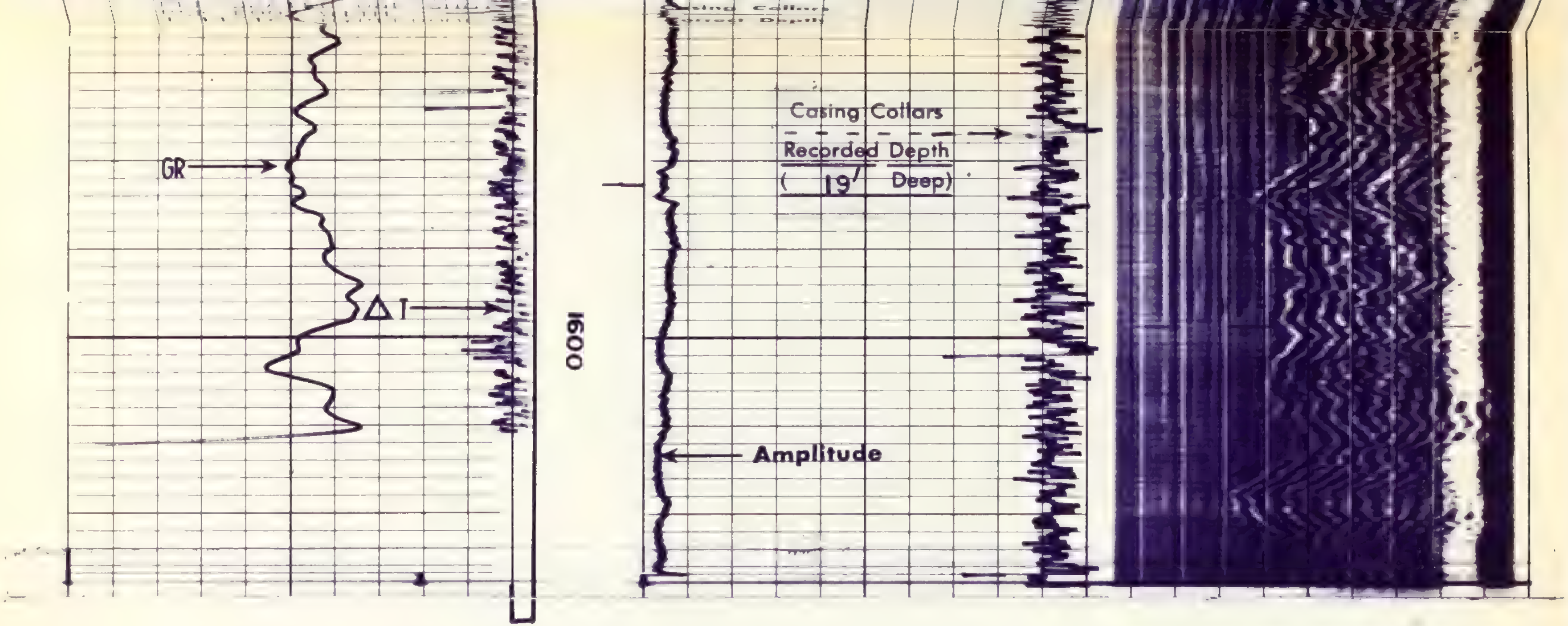

Amplitude
Casing Collars
Correct Depth
PROBABLE CEMENT TOP
Casing Collars
Recorded Depth
(19' Deep)
1000
ΔT

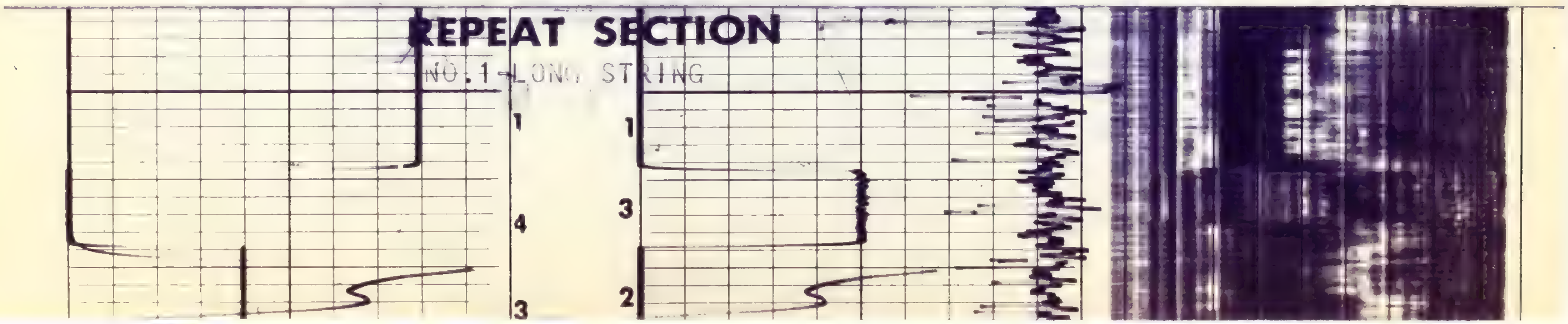

1100

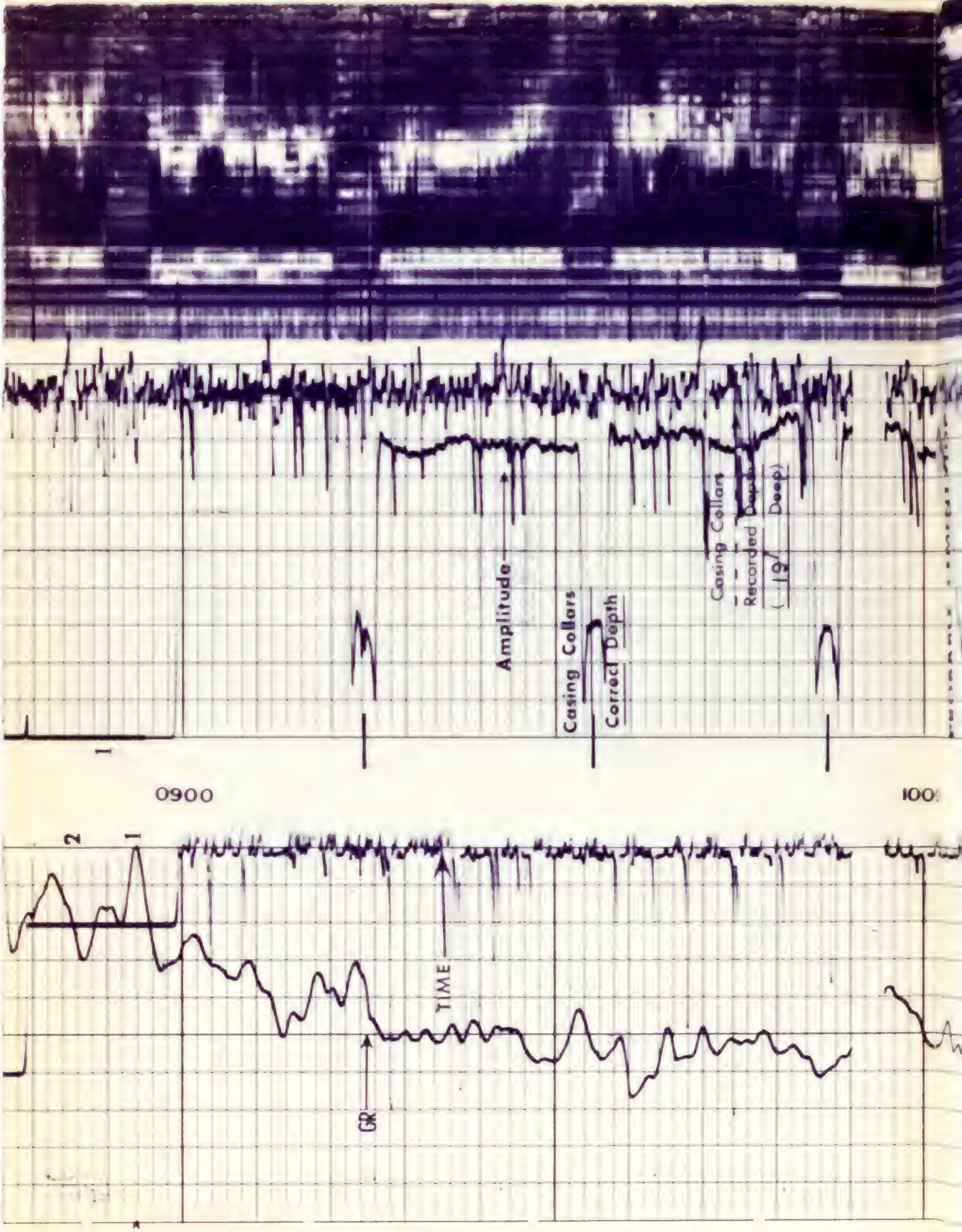

1200
1300

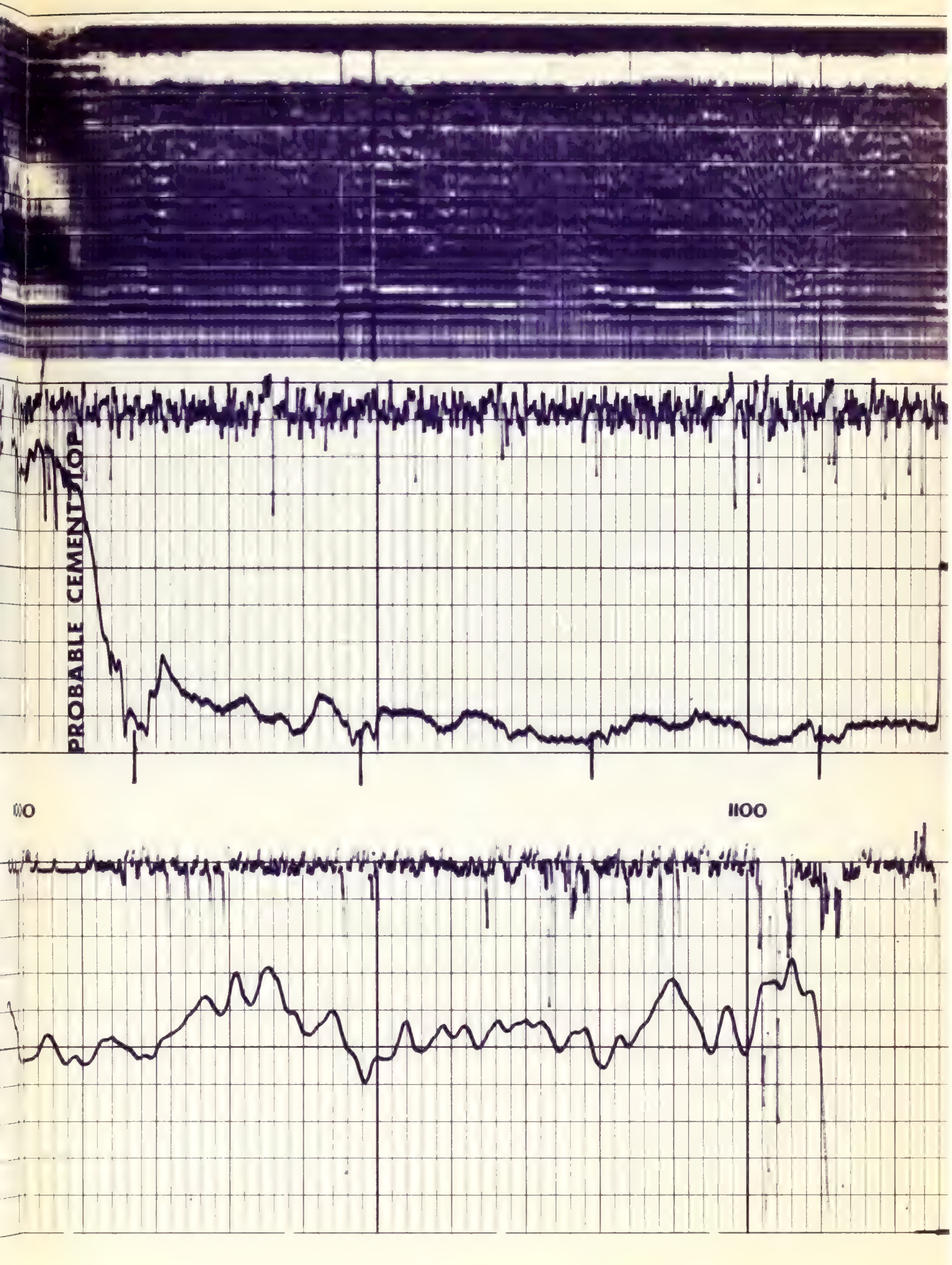

1400

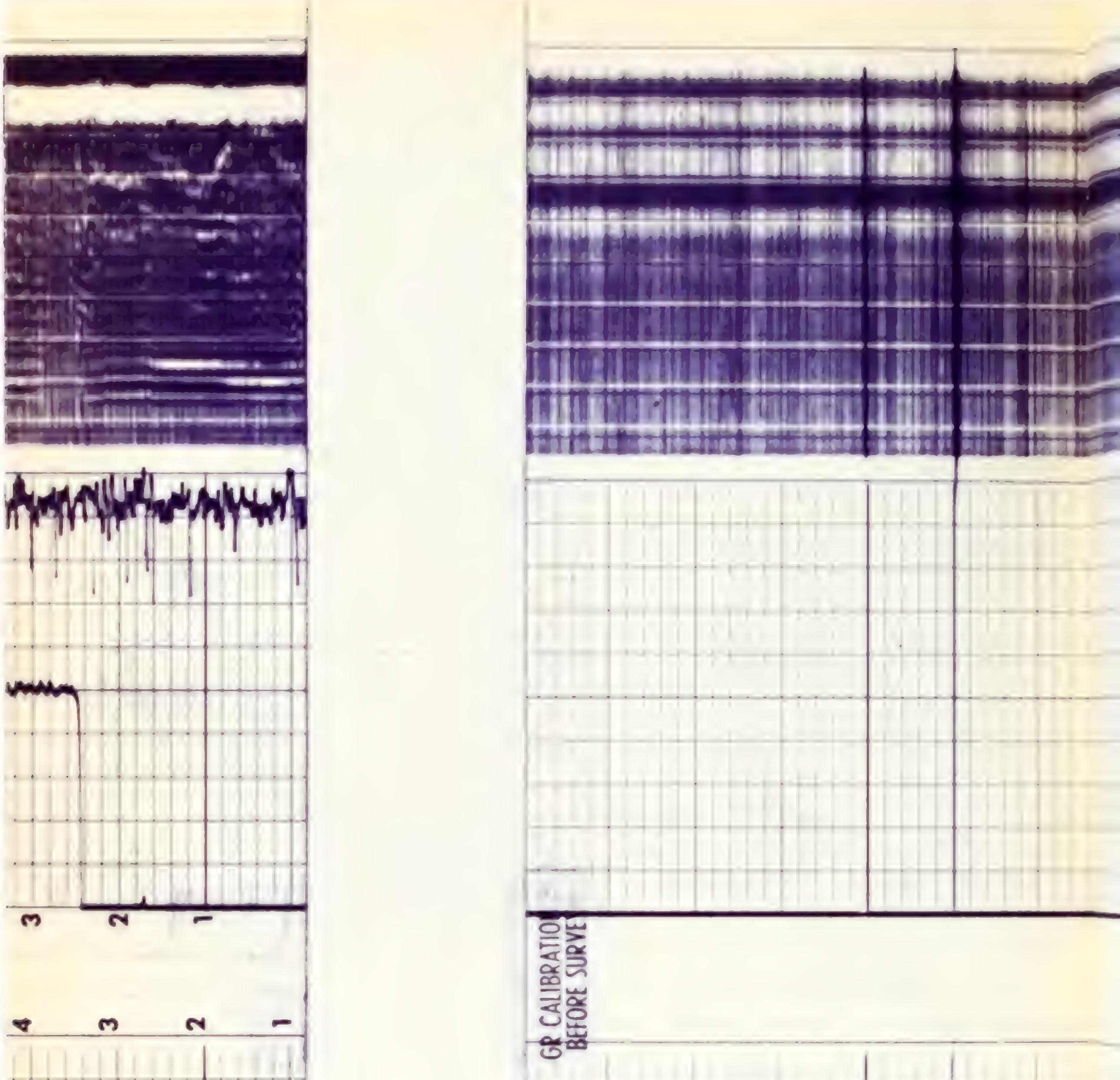

Casing Collars
Correct Depth
1500
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16 HYPERDOME

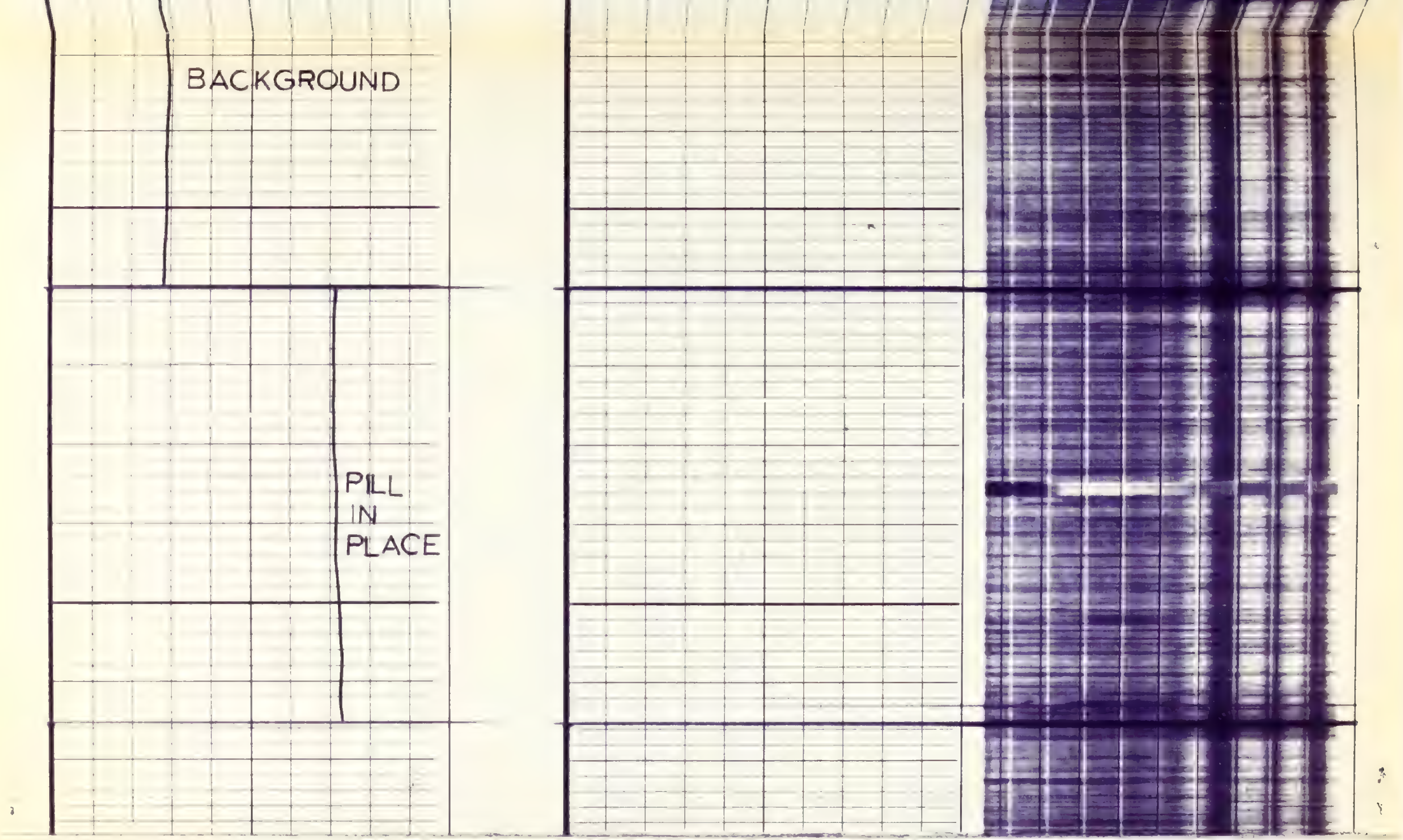

GR
ΔT
1600
Casing Collars
Recorded Depth
(19' Deep)
Amplitude

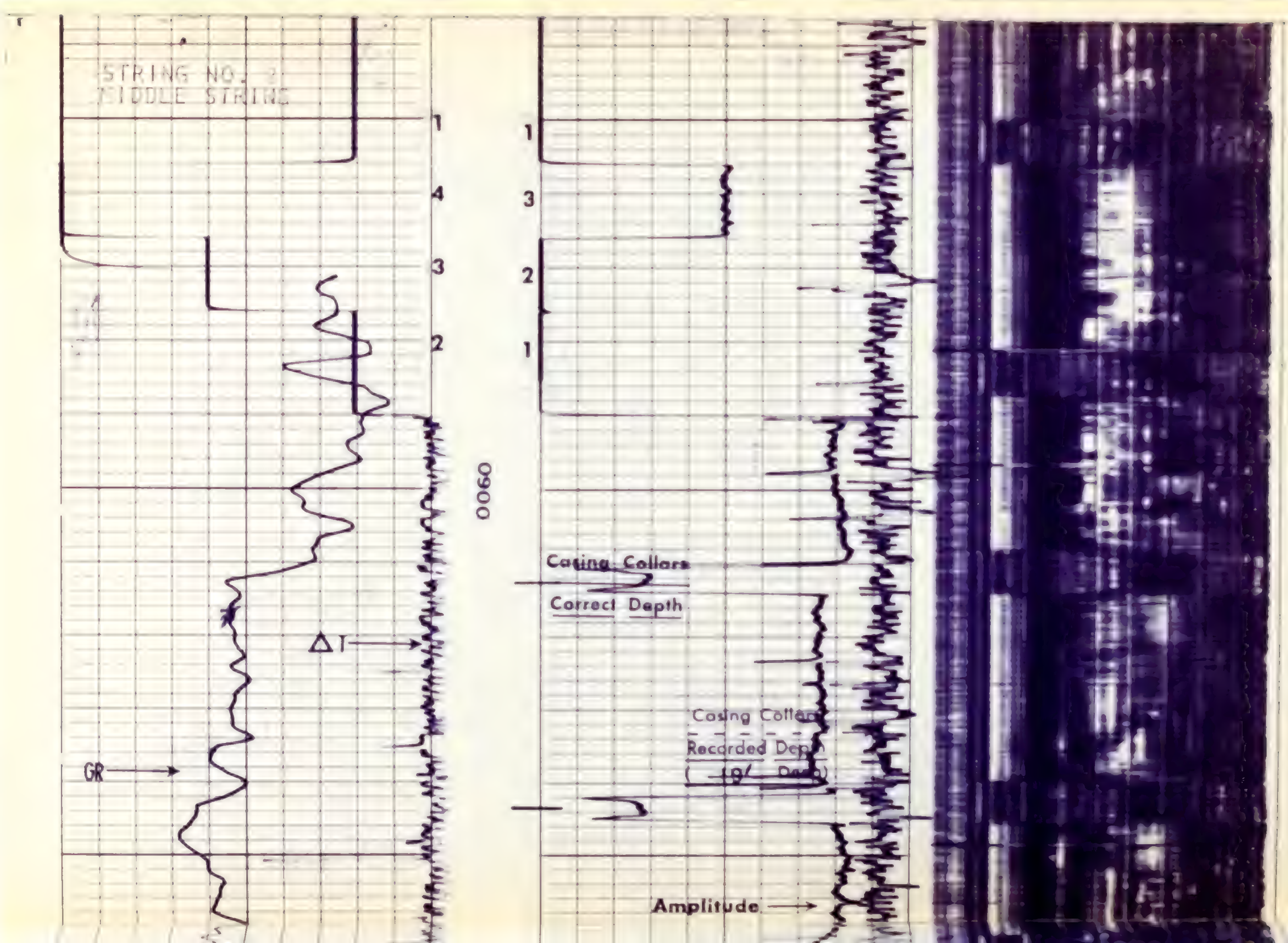

REPEAT SECTION
NO.1-LONG STRING
1
4
3
1
3
2

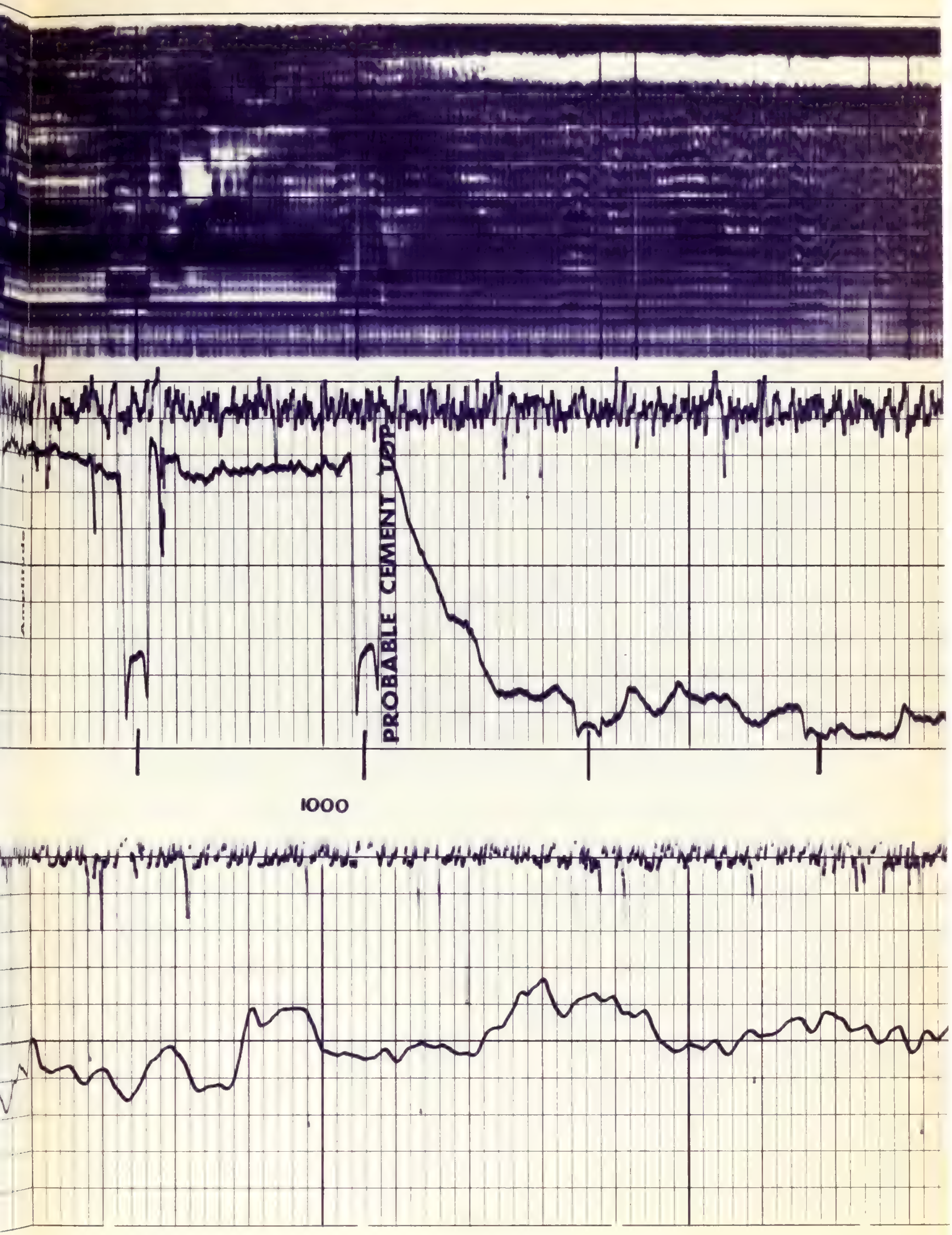

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
1
0900
100
2
1
TIME
GR

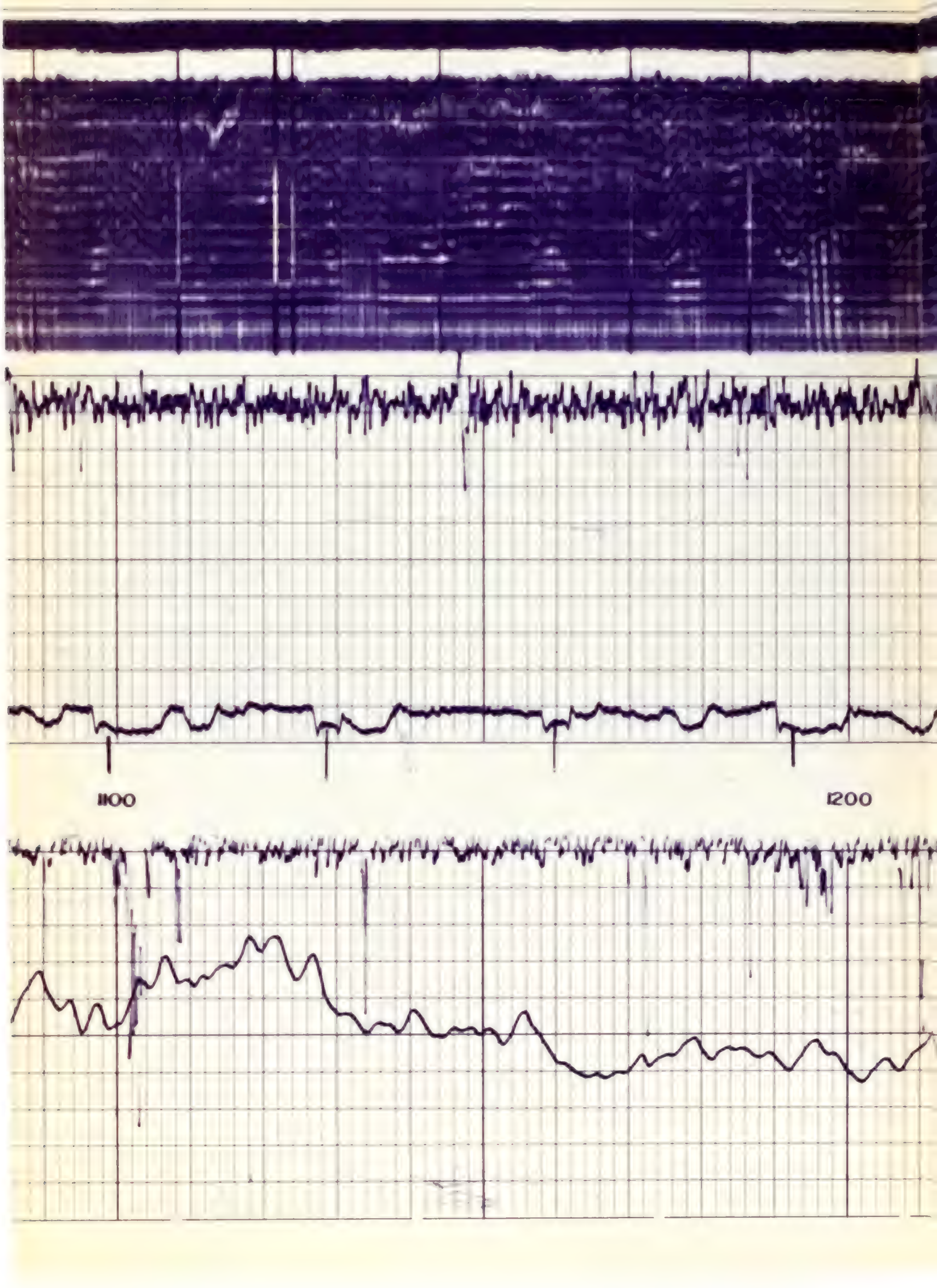

PROBABLE CEMENT TOP
000
1100

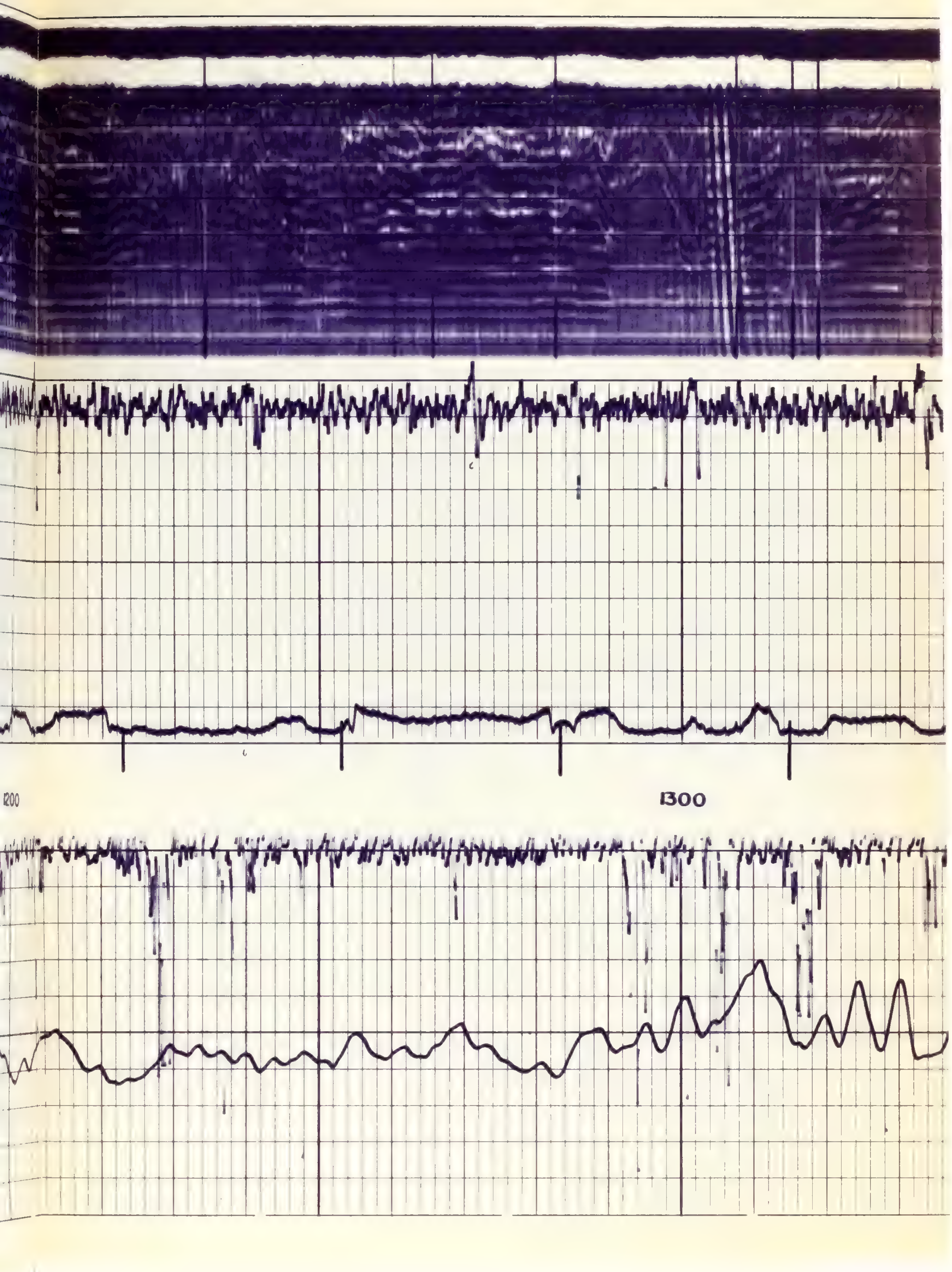

3
2
1
4
3
2
1
GR CALIBRATIO
BEFORE SURVE
Mech. Zero

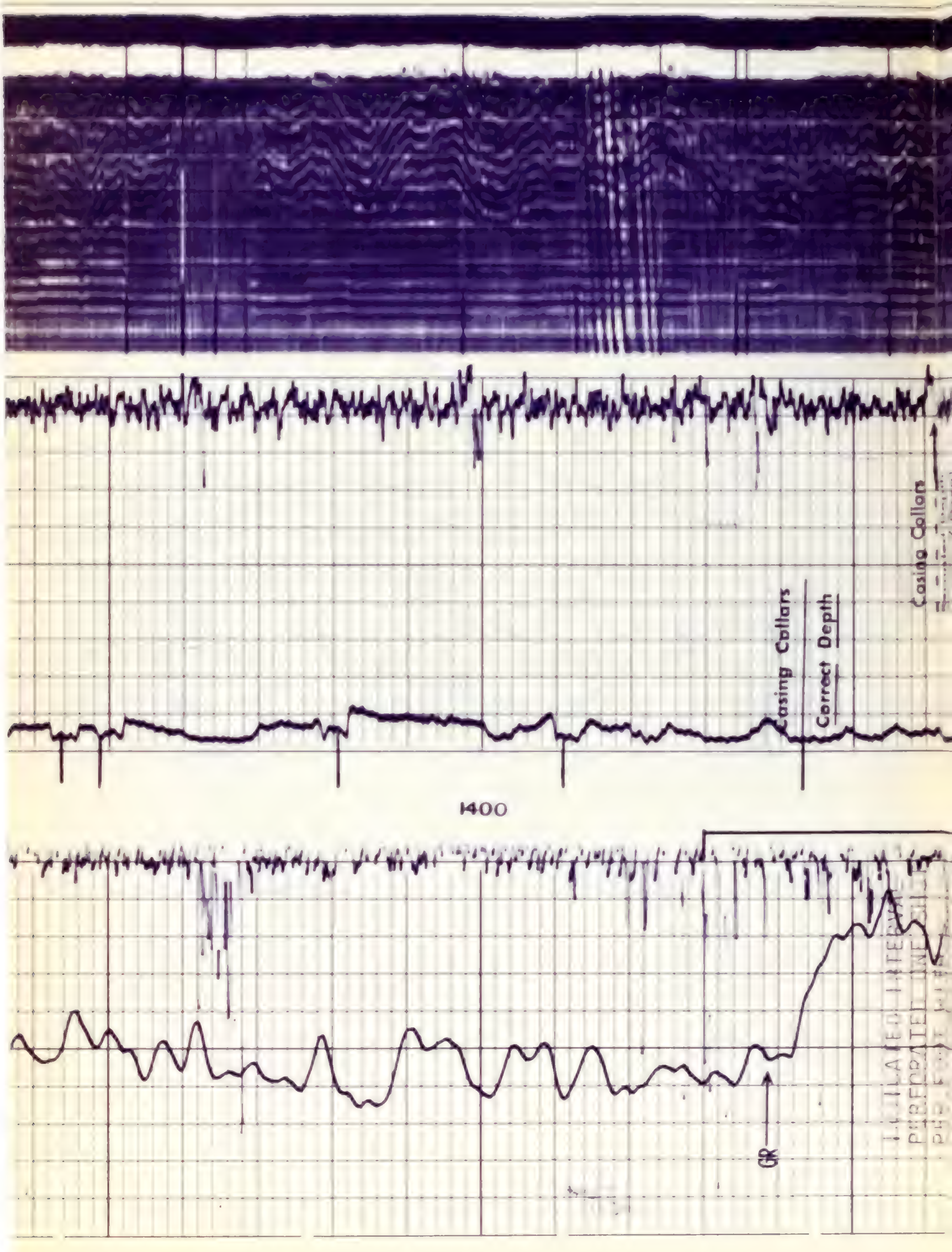

BACKGROUND
PILL IN PLACE

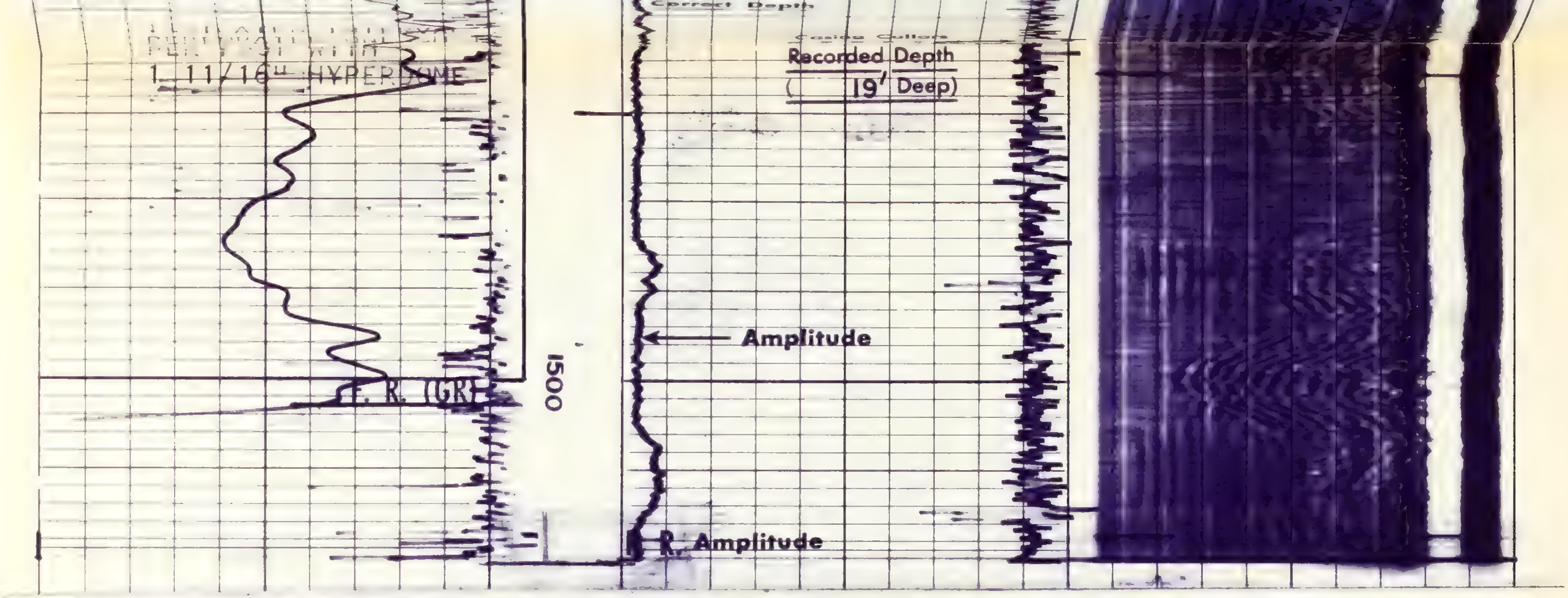

STRING NO. 2
MIDDLE STRING
1
4
3
2
1
3
2
1
0900
Casing Collars
Correct Depth
ΔT
Casing Collars
Recorded Depth
(19' Deep)
GR
Amplitude

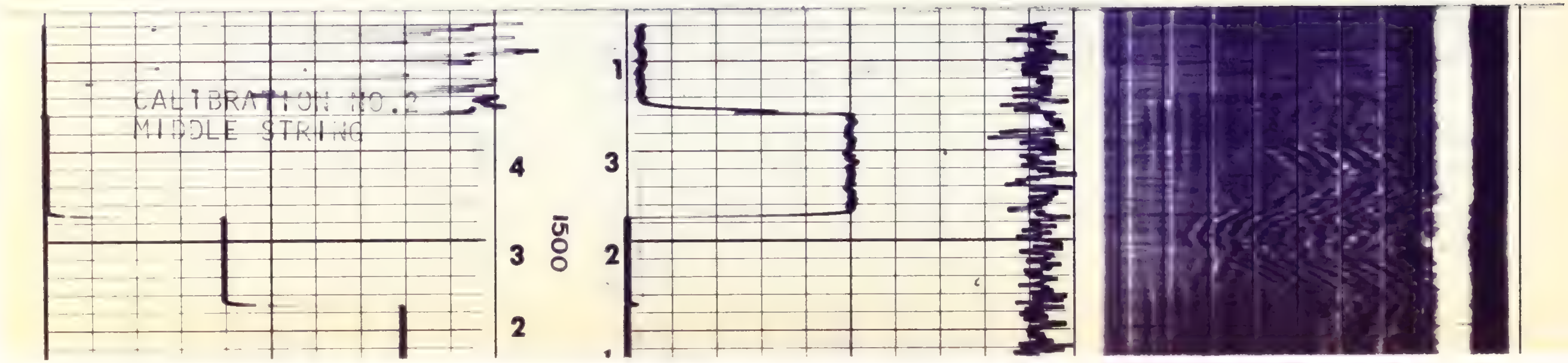

Amplitude
PROBABLE CEMENT TOP
1000

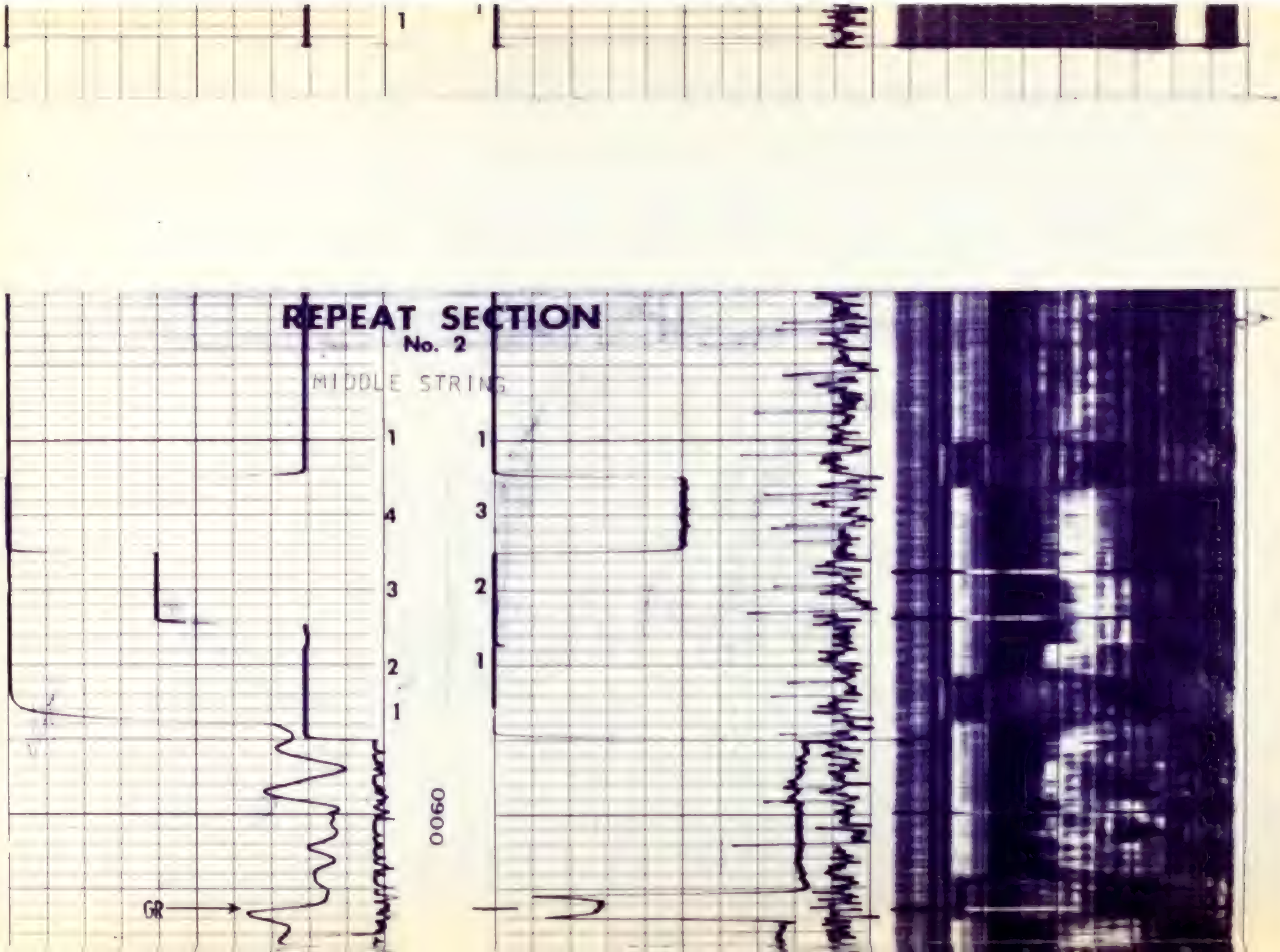

1100
1200

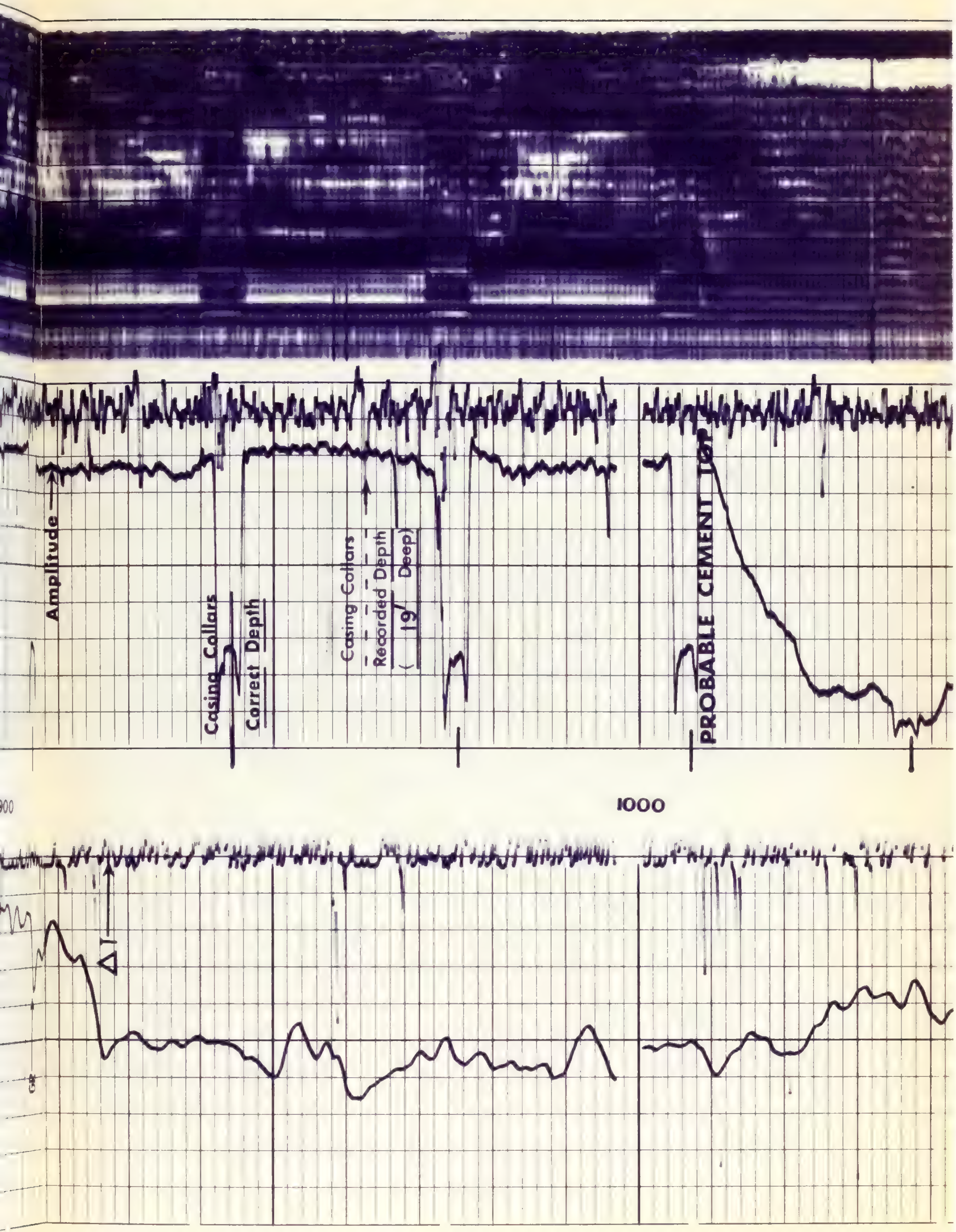

1200
1300

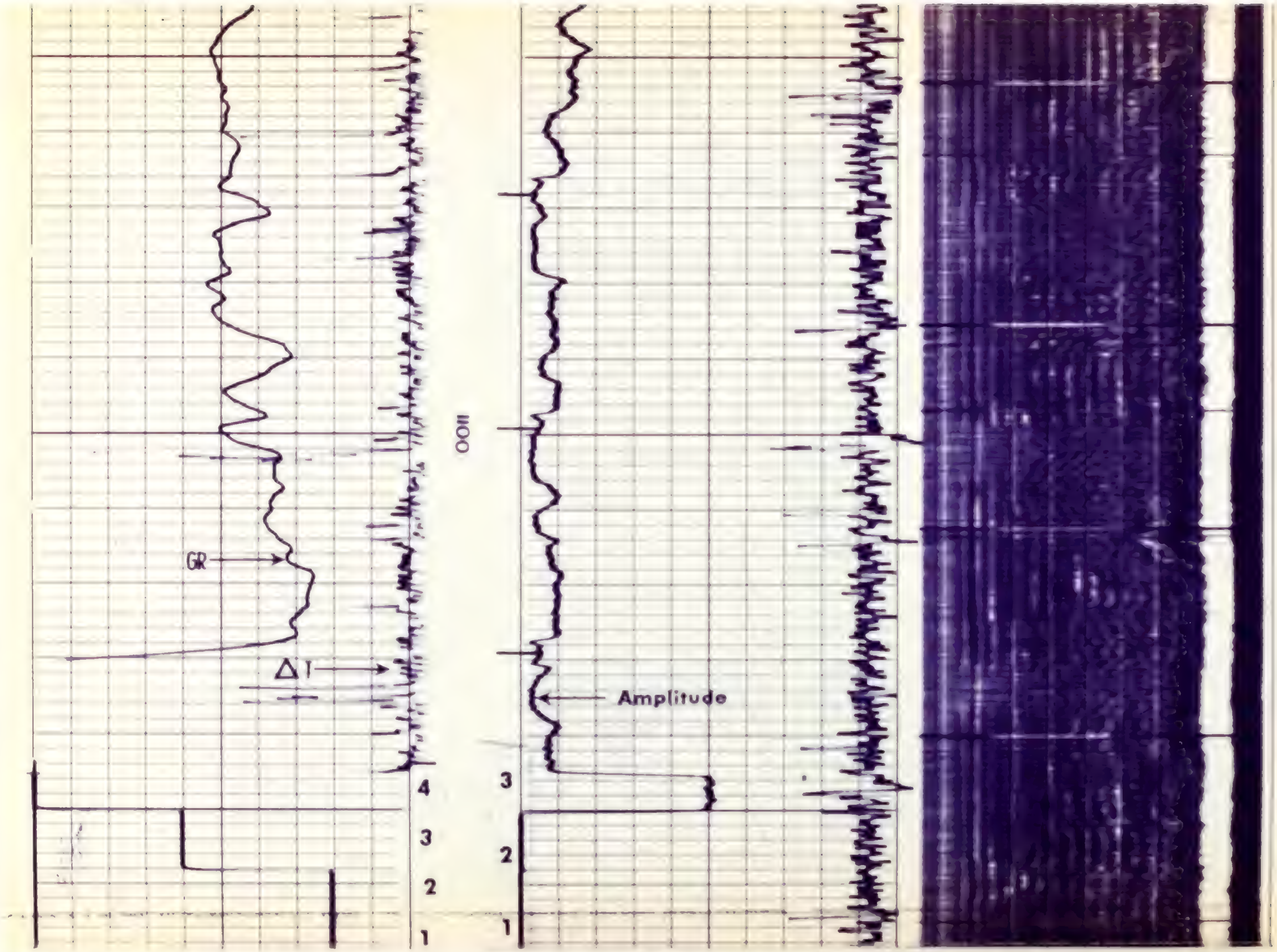

Casing Collars
Correct Depth
Casing Collars
1400
GR
ISOLATED INTERV
PERFORATED ONE
PER FOOT

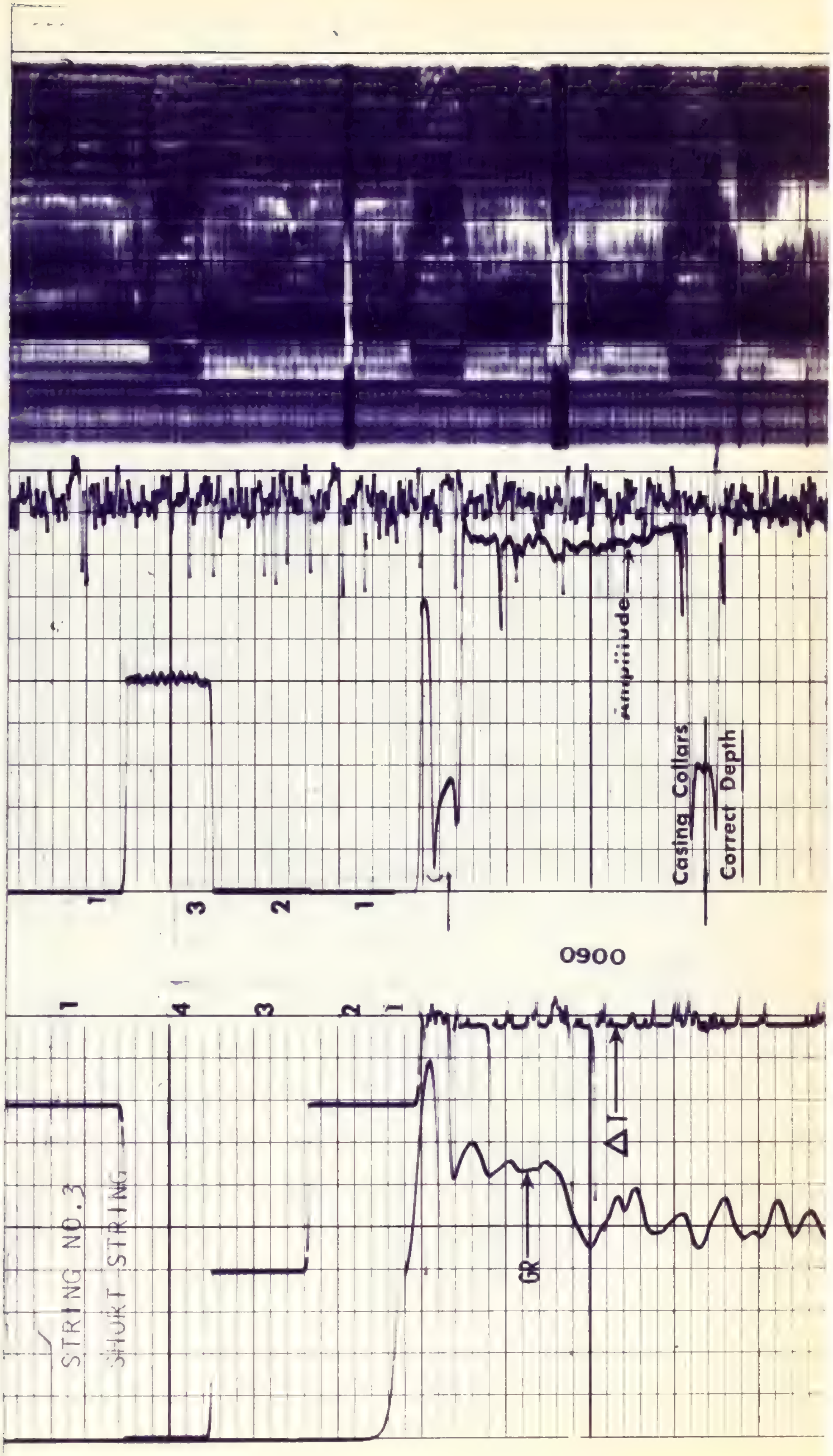

PERFORATE WITH
1 11/16" HYPERDOME
Correct Depth
Casing Collar
Recorded Depth
(19' Deep)
Amplitude
R. Amplitude
1500
F. R. (GR)

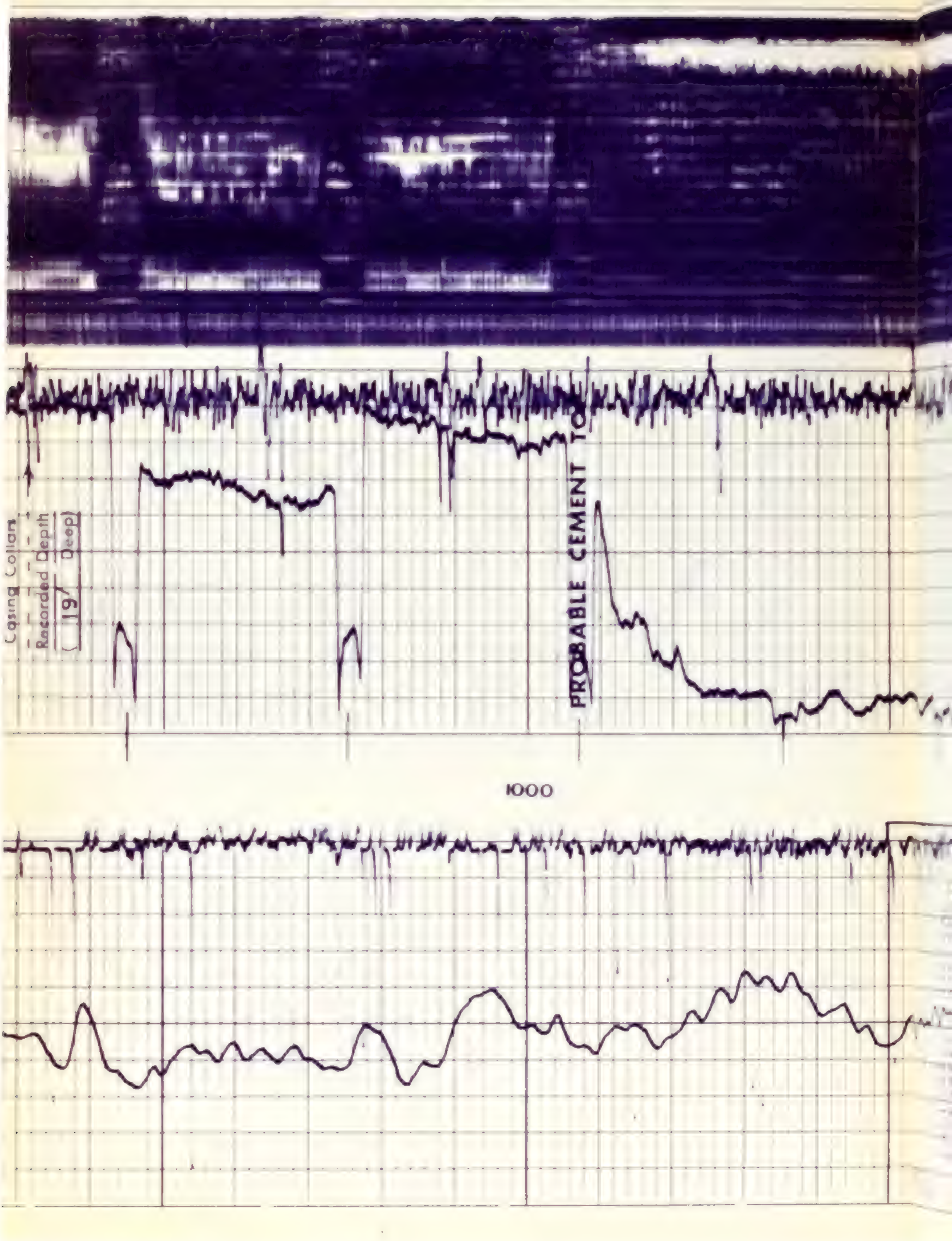

CALIBRATION NO. 2
MIDDLE STRING
1
3
2
1
4
3
2
1500

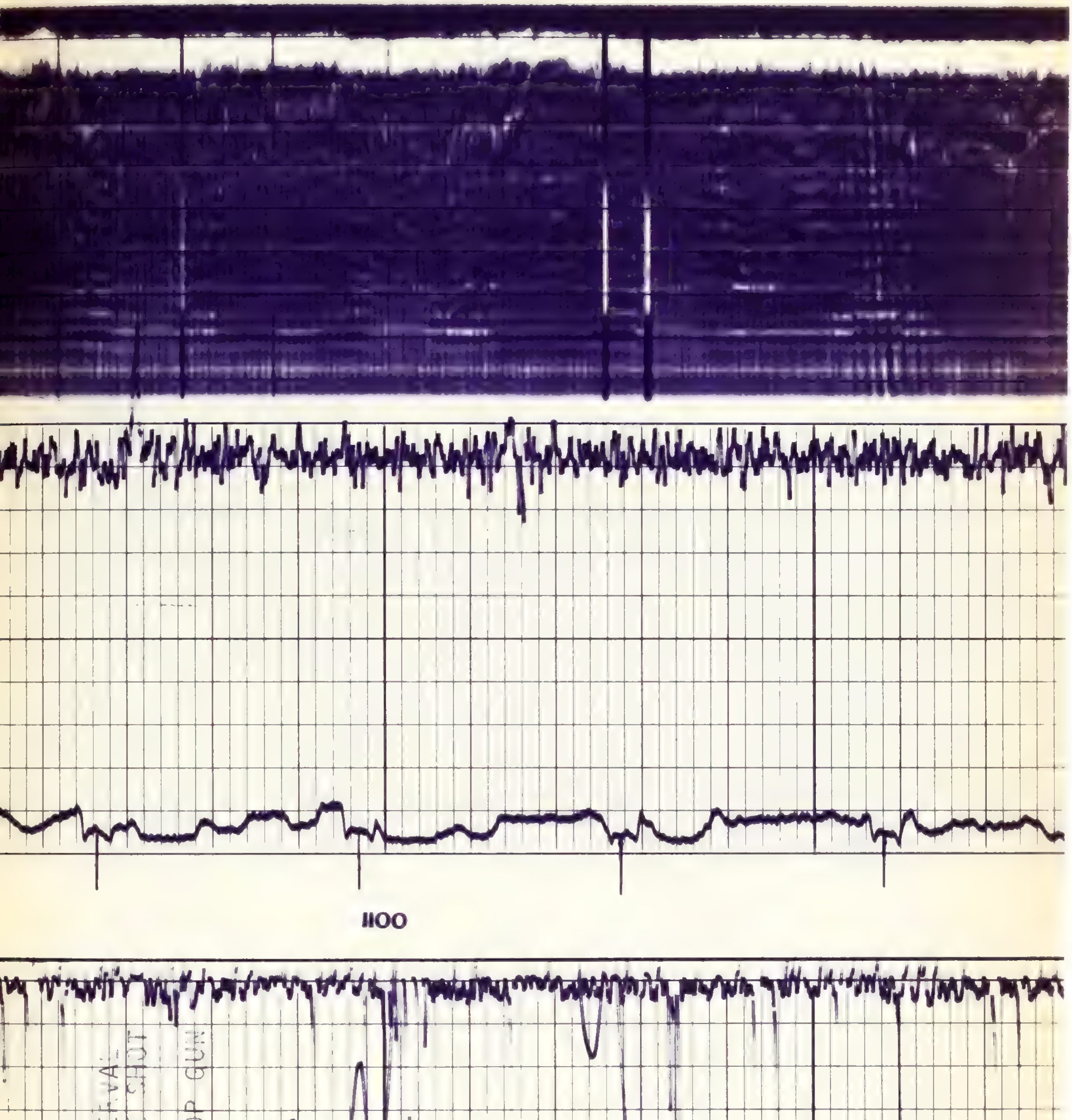

REPEAT SECTION
No. 2
MIDDLE STRING
1
4
3
2
1
1
3
2
1
0900
GR
1
1

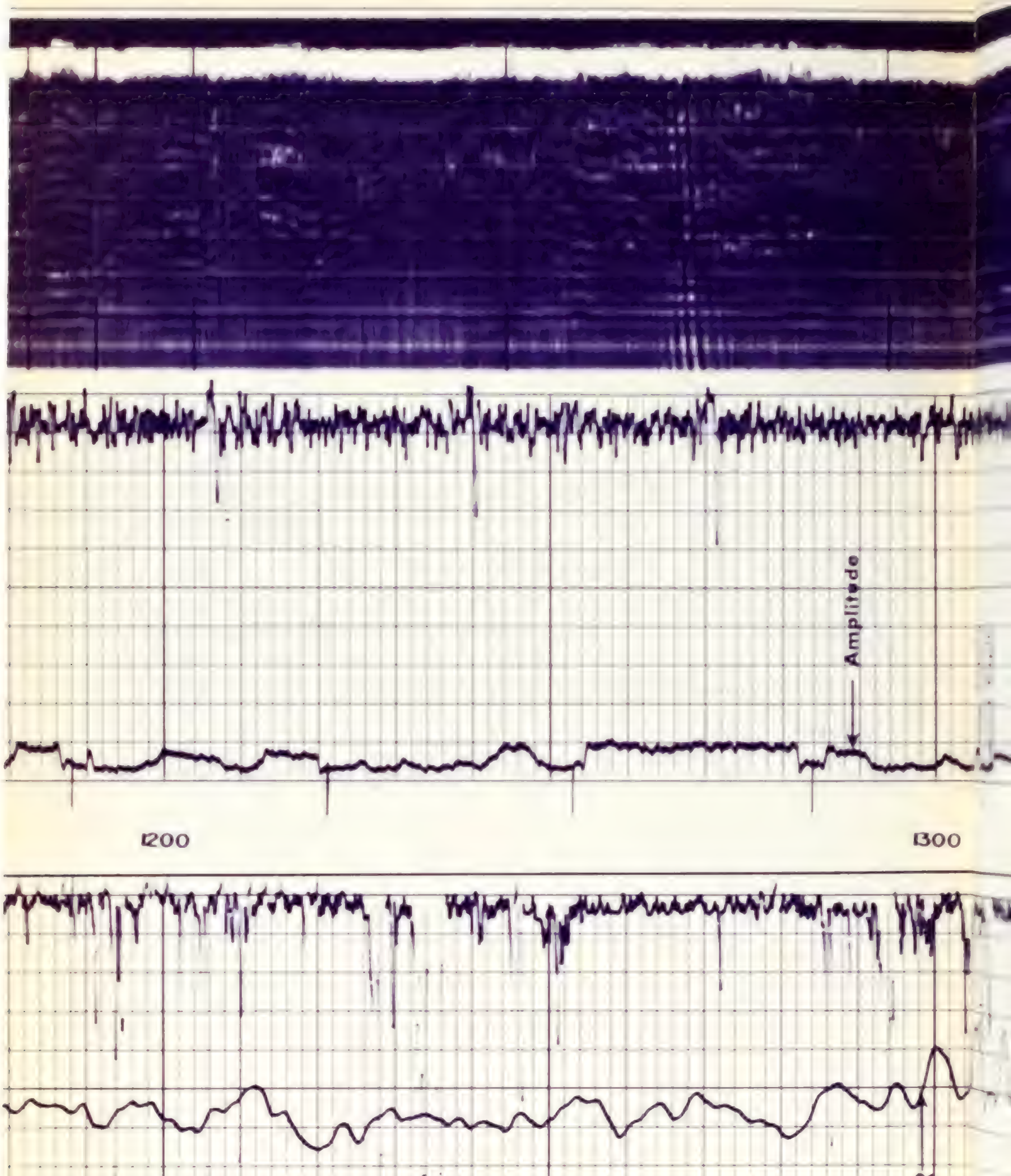

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
900
1000
ΔT
GR

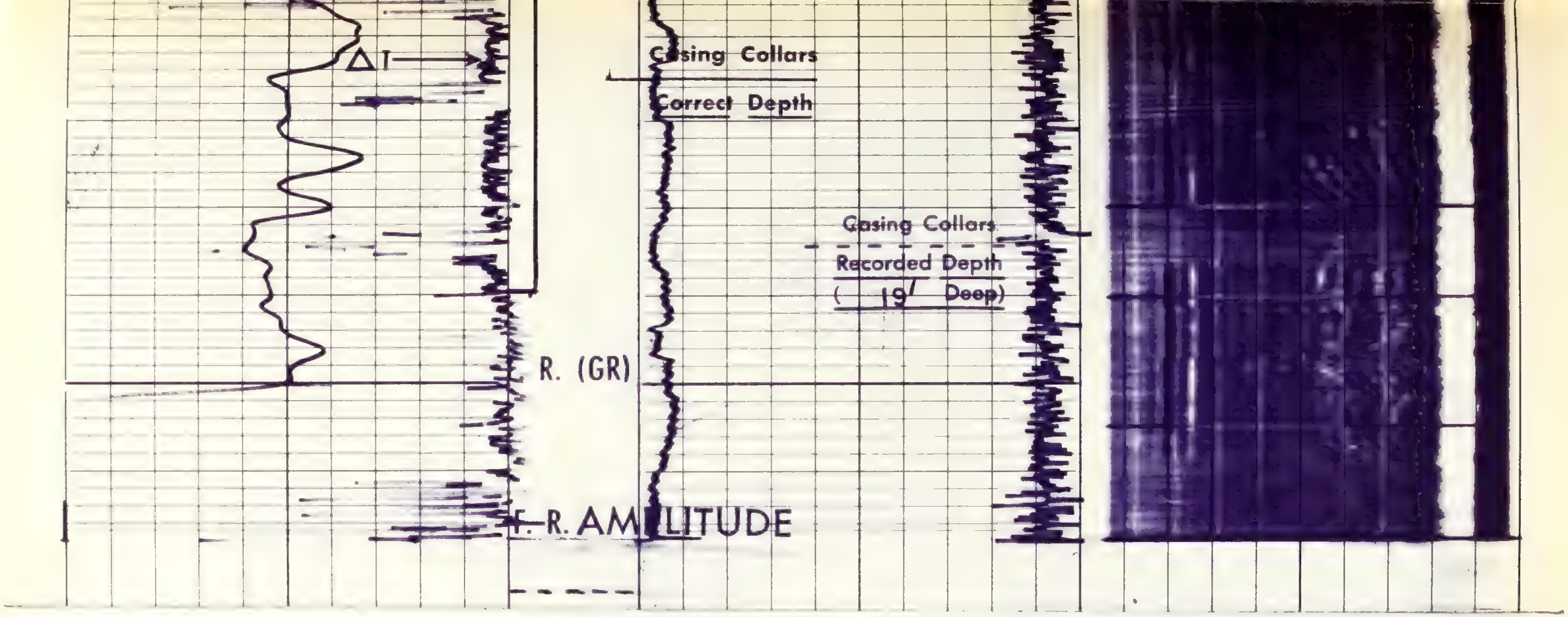

1100
GR
ΔT
Amplitude
4
3
2
1
3
2
1

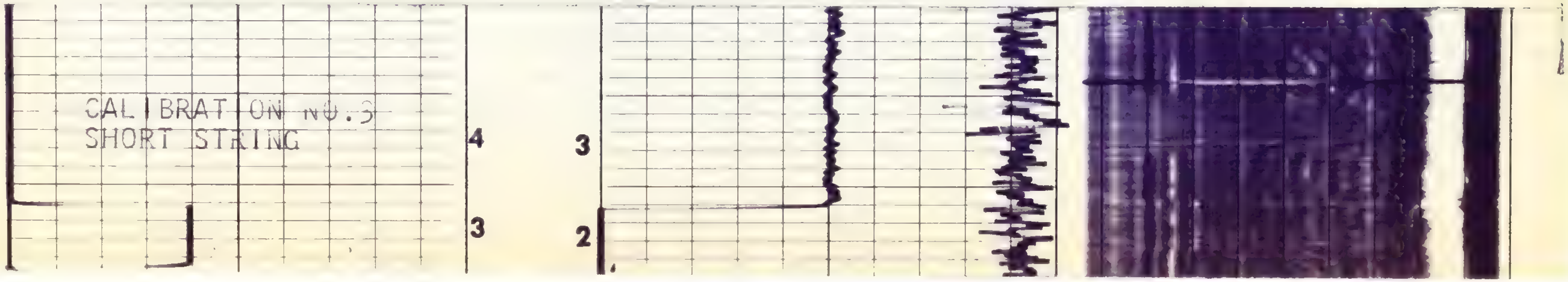

Amplitude
Casing Collars
Correct Depth
1
3
2
1
0900
1
4
3
2
1
STRING NO. 3
SHORT STRING
GR
ΔT


Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TO
1000


1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 3/16" SCALLOP GUN


Amplitude
1200
1300
GR


ΔT
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
R. (GR)
T. R. AMPLITUDE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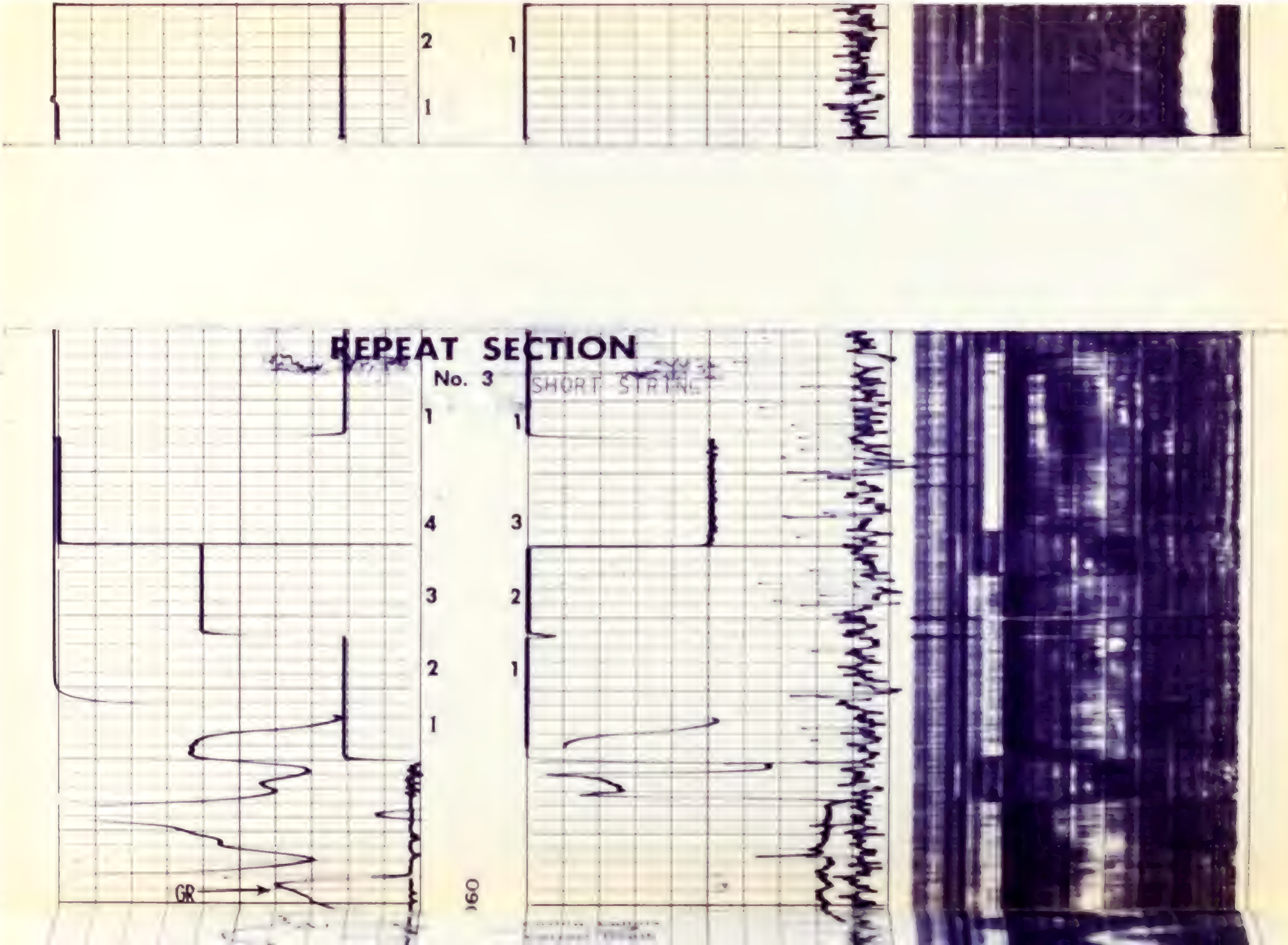
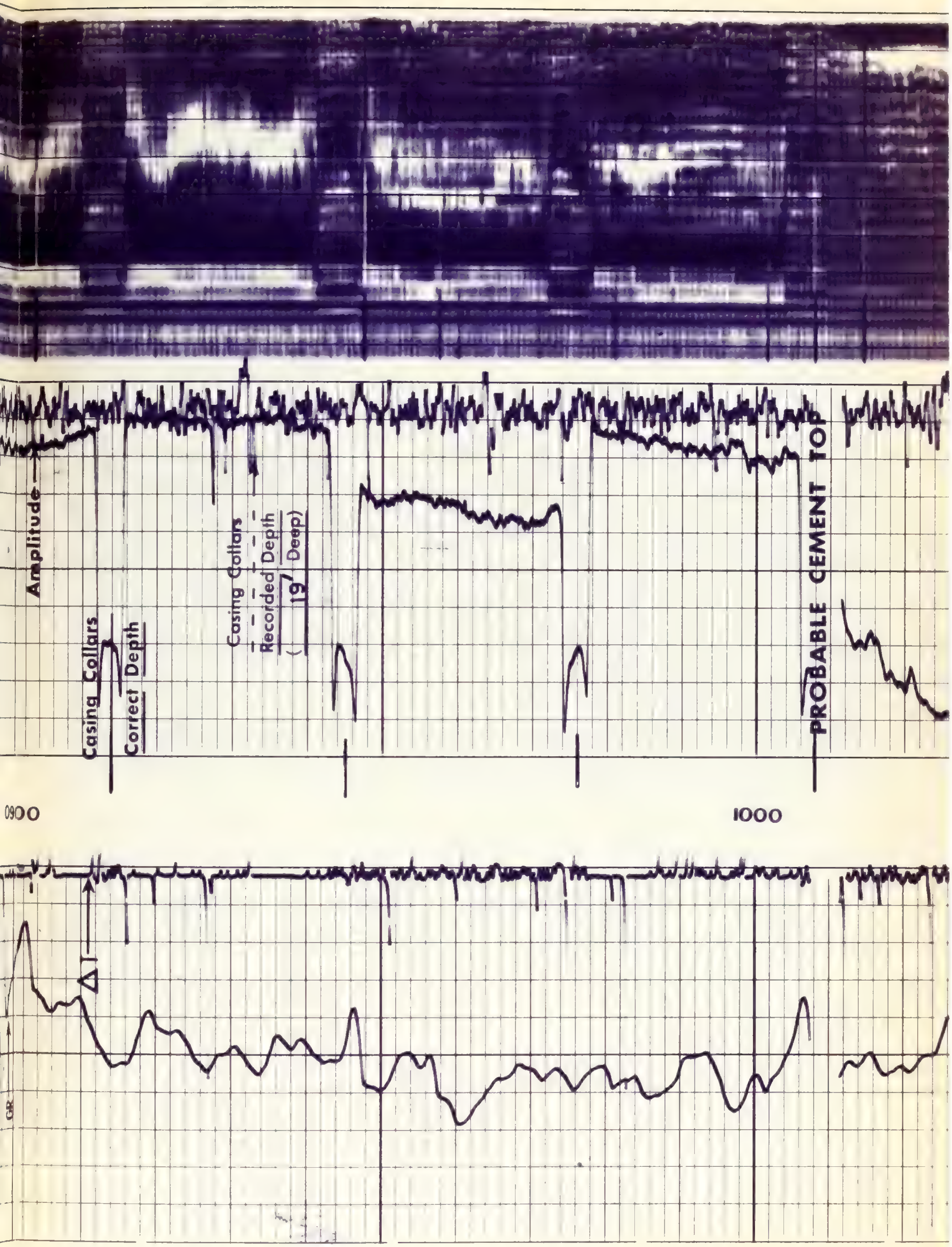
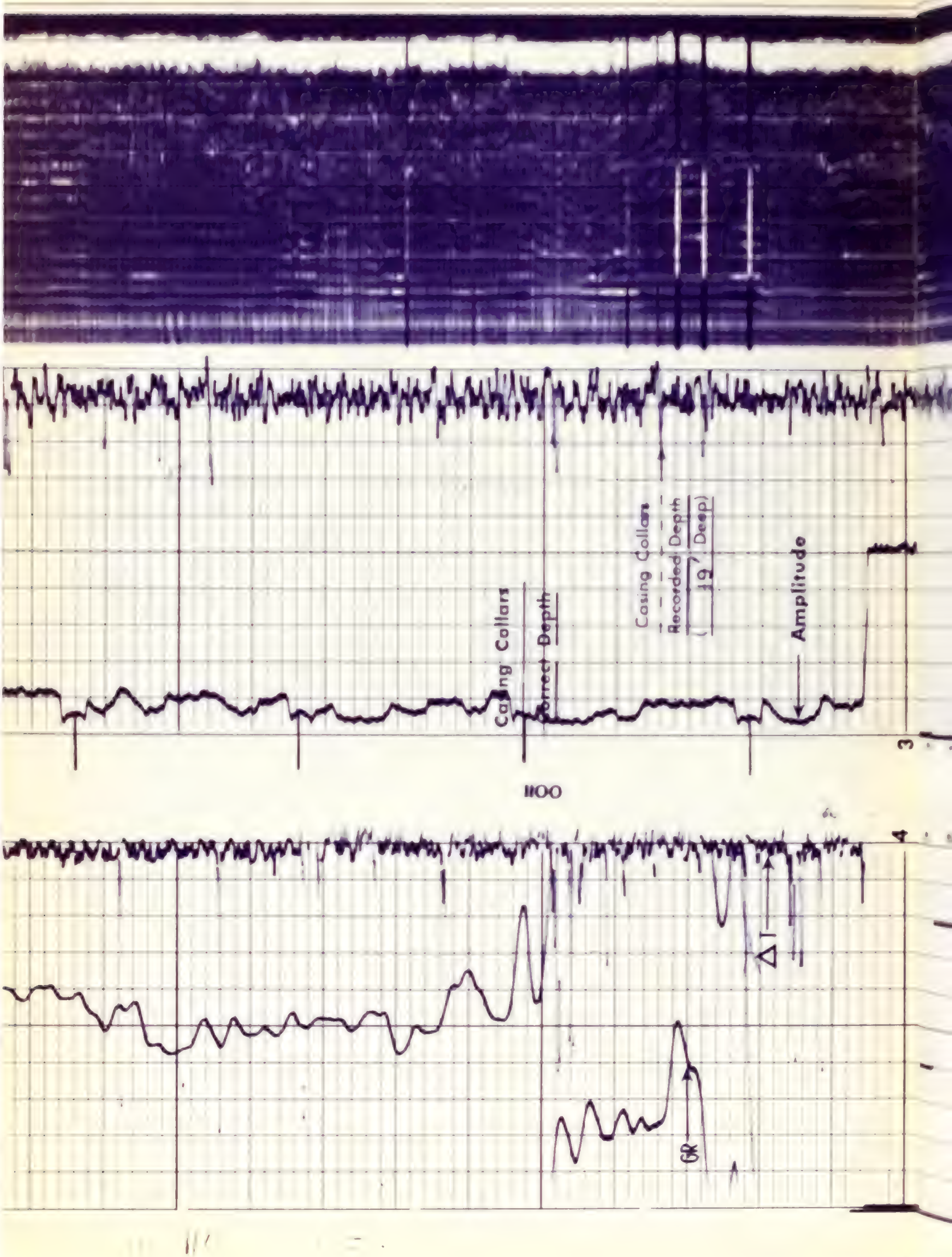
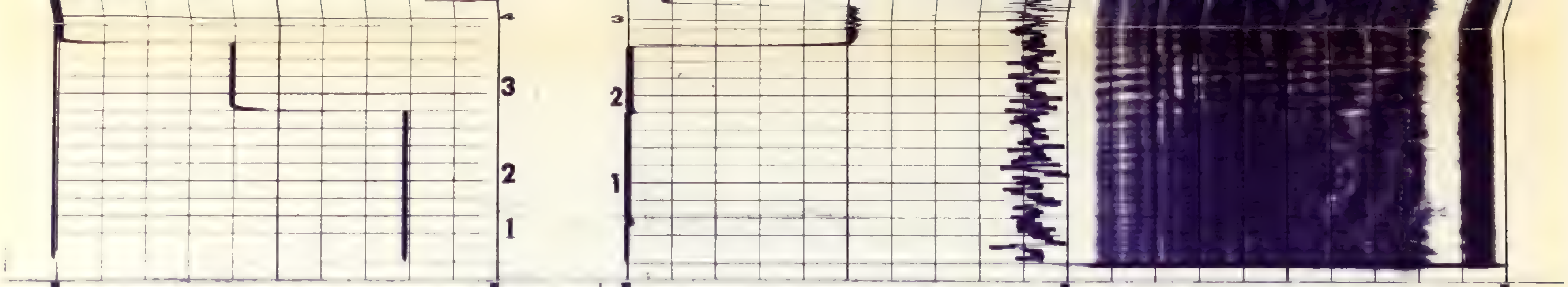
SHORT STRING
4
3
3
2


2
1
1
REPEAT SECTION
No. 3
SHORT STRING
1
1
4
3
3
2
2
1
1
GR
09


Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
0900
1000
ΔT
GR


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
1100
3
4
ΔT
GR



Casing Collars
Corrected Depth

TRANSIT TIME

MICROSECONDS ______ SPACING
400 200

GAMMA RAY

API UNITS

DEPTH

CASING BOND

MILLIVOLTS
0 100

VARIABLE DENSITY

MICROSECONDS 5′ SPACING
200 1200

COMPANY ATLANTIC RICHFIELD COMPANY
WELL AT-1C
FIELD
COUNTY RIO BLANCO STATE COLORADO

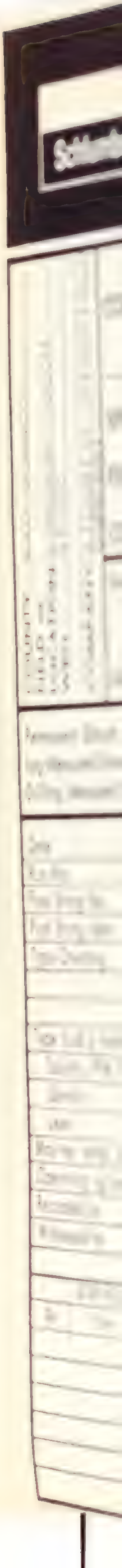
		ONE	TWO	THREE
SCHL.	FR	1628	1522	1367
SCHL.	TD	1636	1530	1375
DRLR	TD	1638	1528	1373

Elev:
KB ----
DF ----
GL 6909

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE

4 400 - sec



Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL AT-1C
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL AT-1C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:

Sec. 7 Twp. 3S Rge. 96W

Other Services:
CBL-GR-
VDL-CCL

Permanent Datum: GROUND LEVEL ; Elev.: 6909
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6909

Date	9/19/74
Run No.	ONE
Pipe String No.	1-2-3
Pipe String Ident.	LONG-MIDDLE-SHORT
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	----
Density	----
Level	FULL
Max rec. temp., deg F.	----
Operating rig time	
Recorded by	ST. AUBYN
Witnessed by	MR. ROSS- MR. ELLARD

BORE-HOLE RECORD			CEMENTING RECORD				
Bit	From	To		Type	Wgt.	From	To
			Primary				
			Squeeze				

FOLD HERE

The well name, location and borehole reference data were furnished by the customer

EQUIPMENT DATA			
Hoist Truck No.	3862	Rotator Size	1 11/16
Inst. Truck No.	3862	Rotator No.	46
Tool Serial No.	511	Indexer Type	POWERED
Location	VERNAL	Indexer No.	46

DEPTHS RELATE TO

Radioactivity Measurements ☒
Schlumberger Line Measurements ☐

CASING COLLARS	

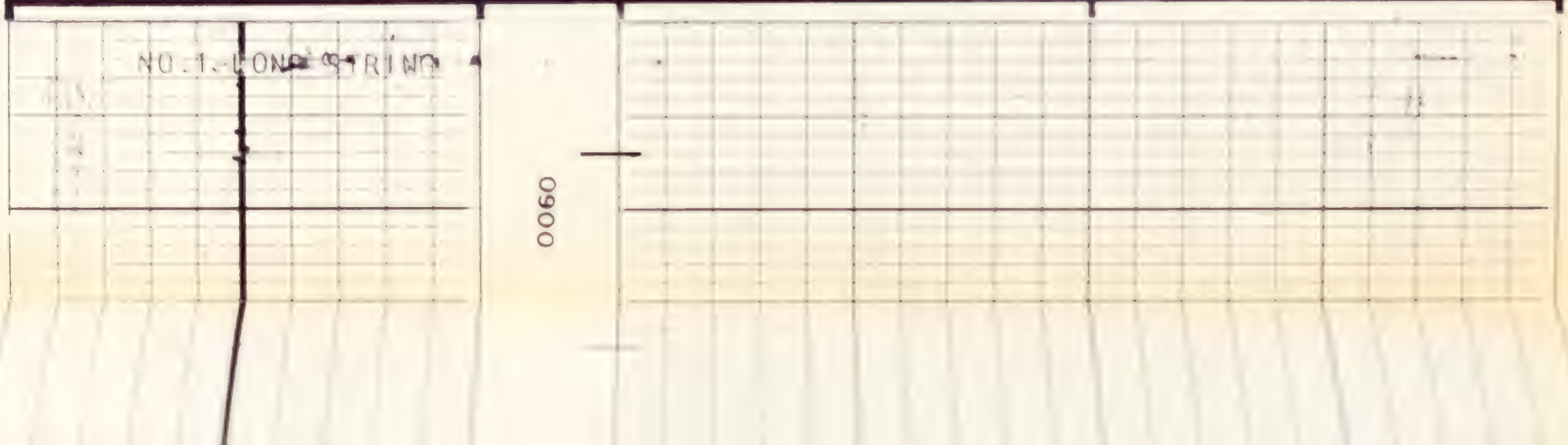
PERFORATING DATA					LOGGING DATA				
Depths		No. Shots	Gun Size	Gun Type	Time Const	Sens. Setting	Zero Shift	Calib Sens	Calib. Defl.
From	To								
1050	1349	291	1 9/16	SCALLOP	NO. 3-SHORT STRING				

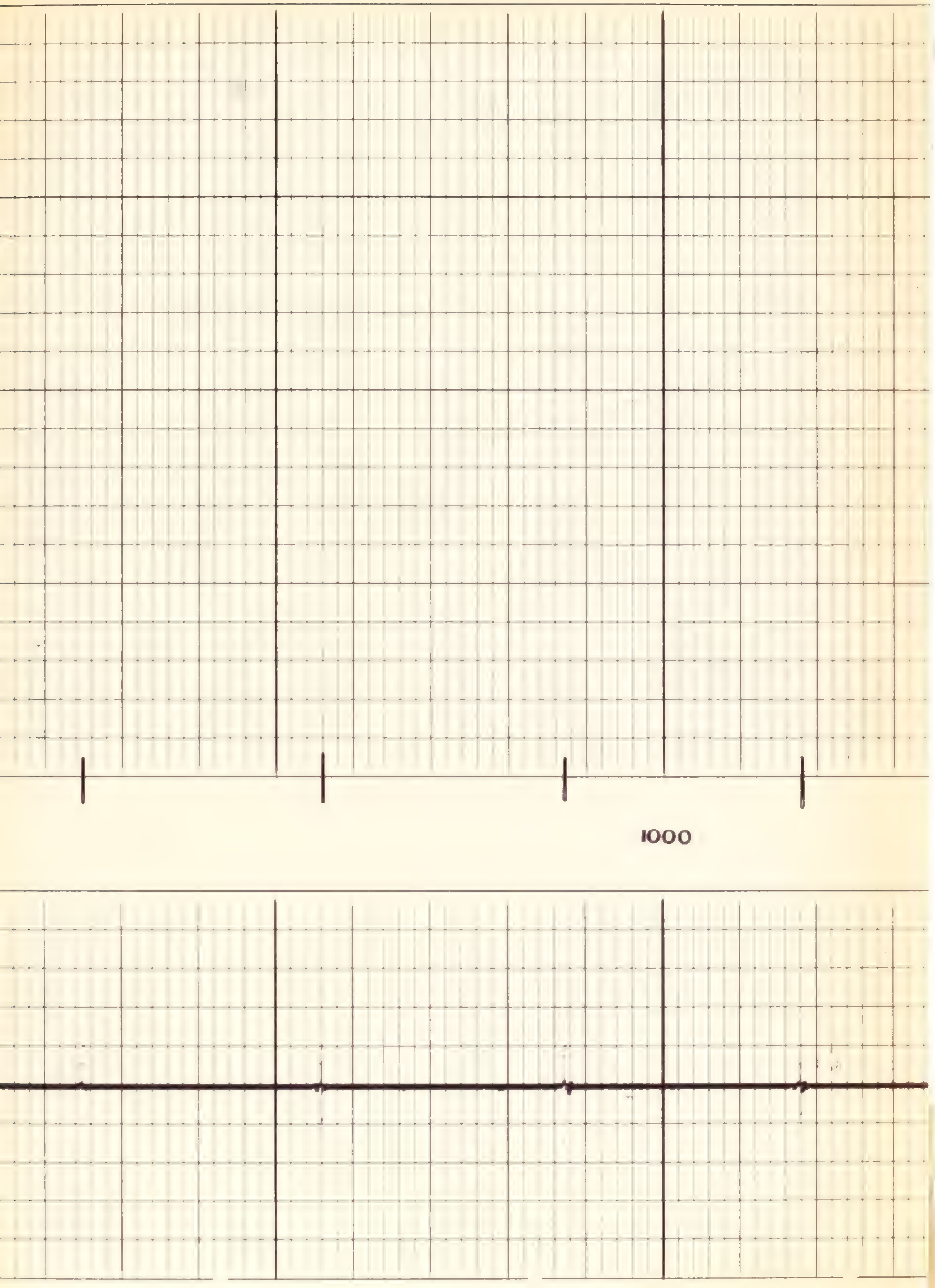
PIPE STRING RECORD

Number	1	2	3	4
Identific'n	LONG	MIDDLE	SHORT	
Size	2 3/8	2 3/8	2 3/8	
Weight	4.7	4.7	4.7	
Depth	1645	1528	1373	

Remarks:

CASING COLLAR LOG BEFORE PERFORATION	DEPTHS		

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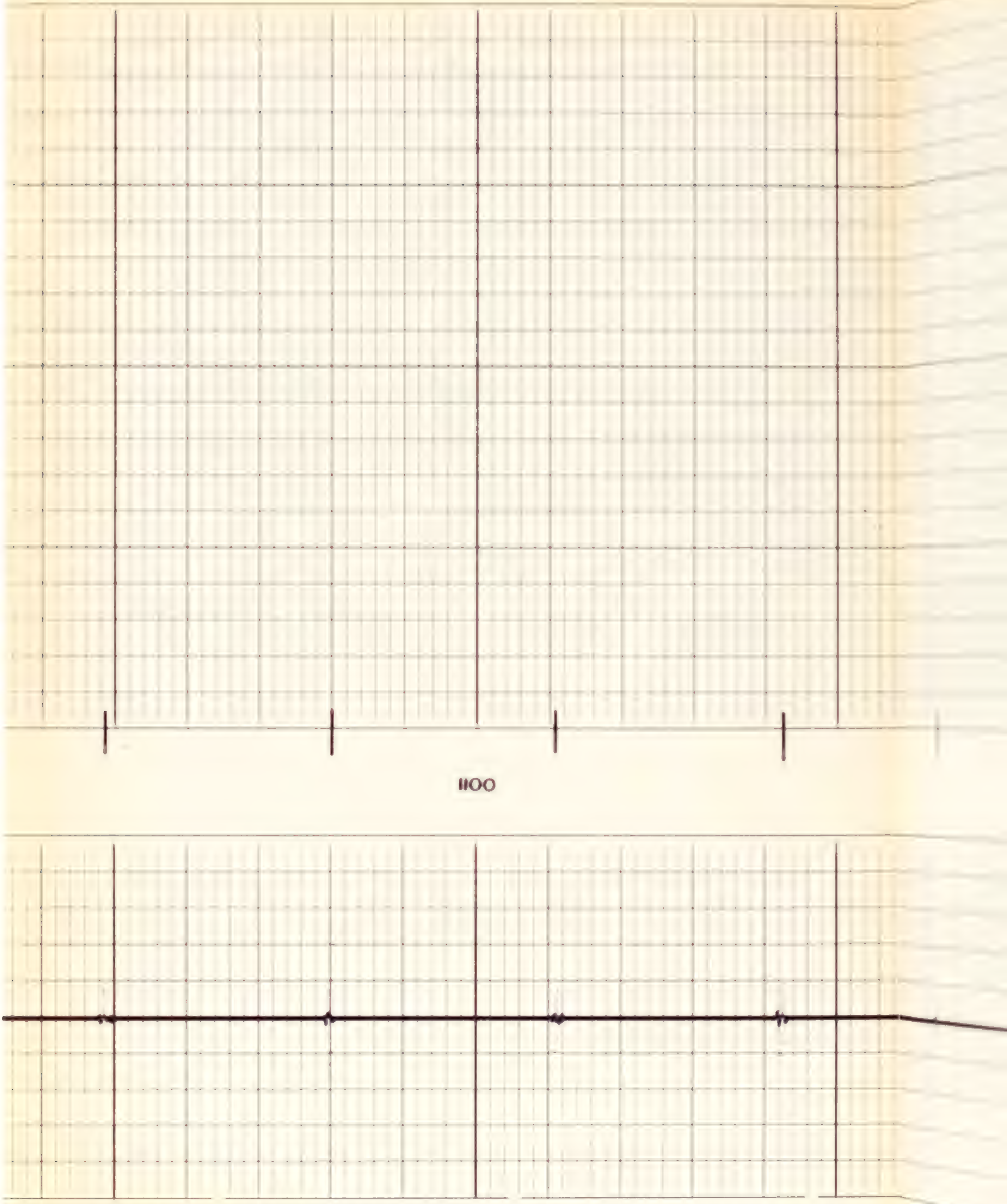
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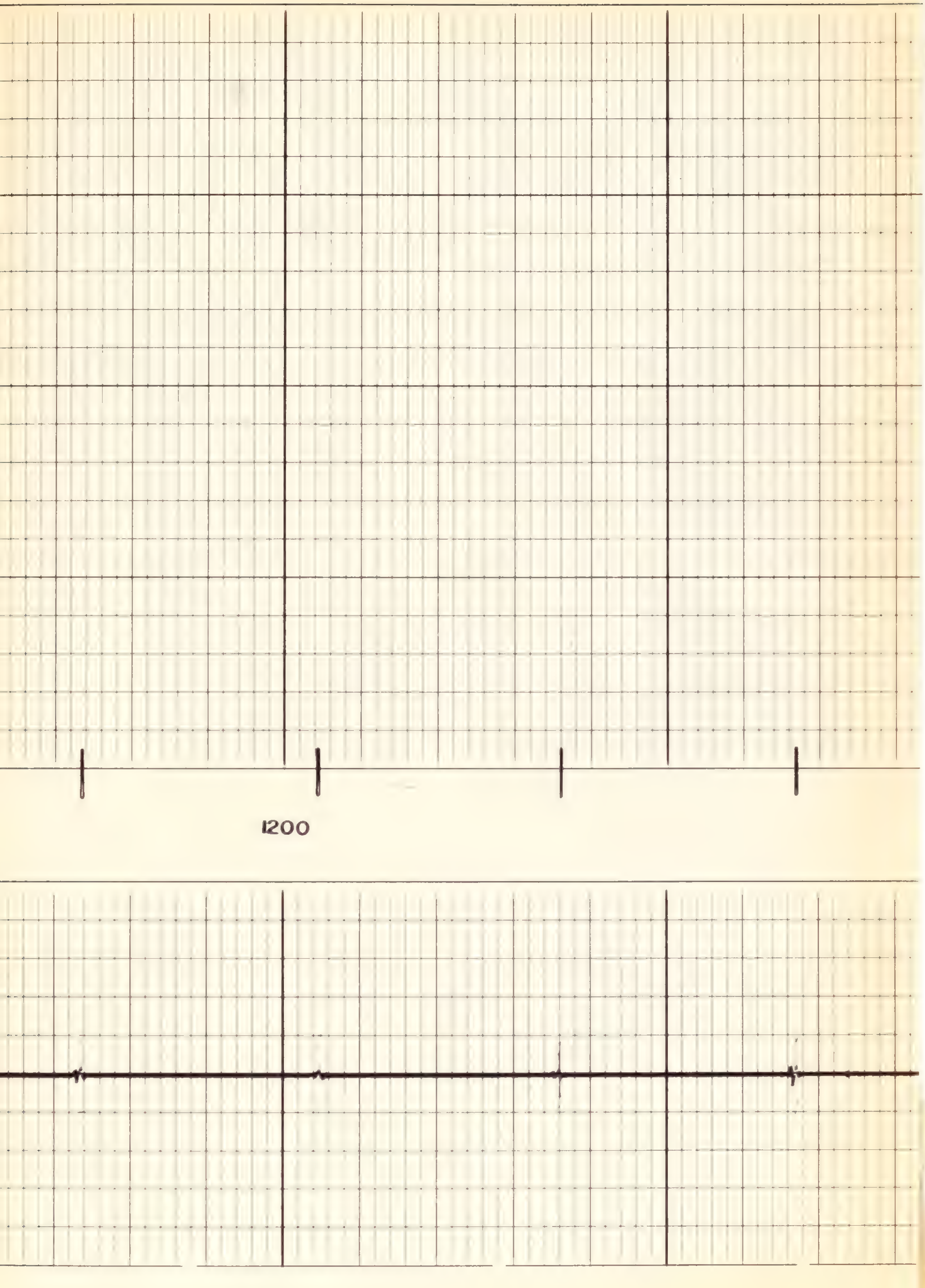
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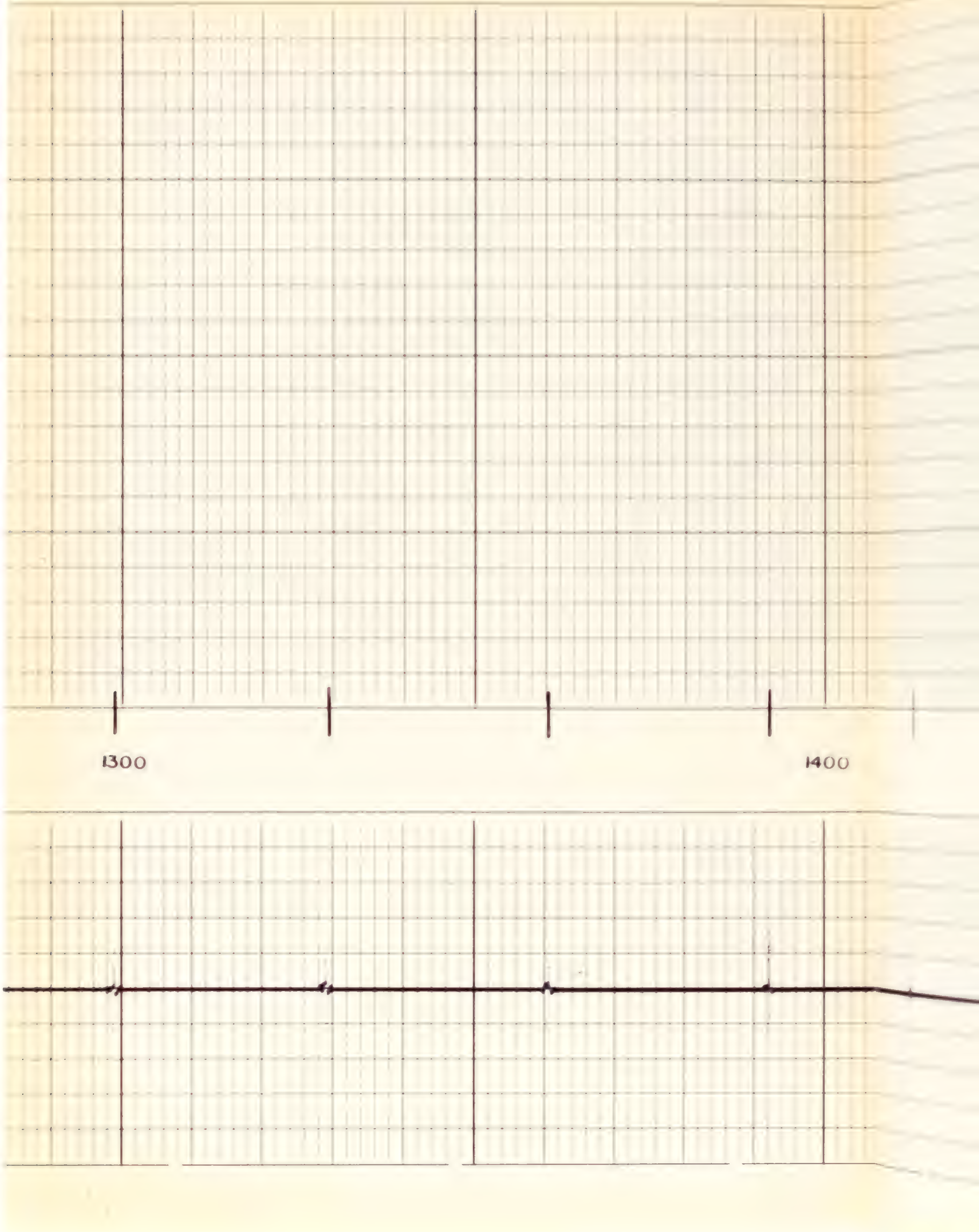
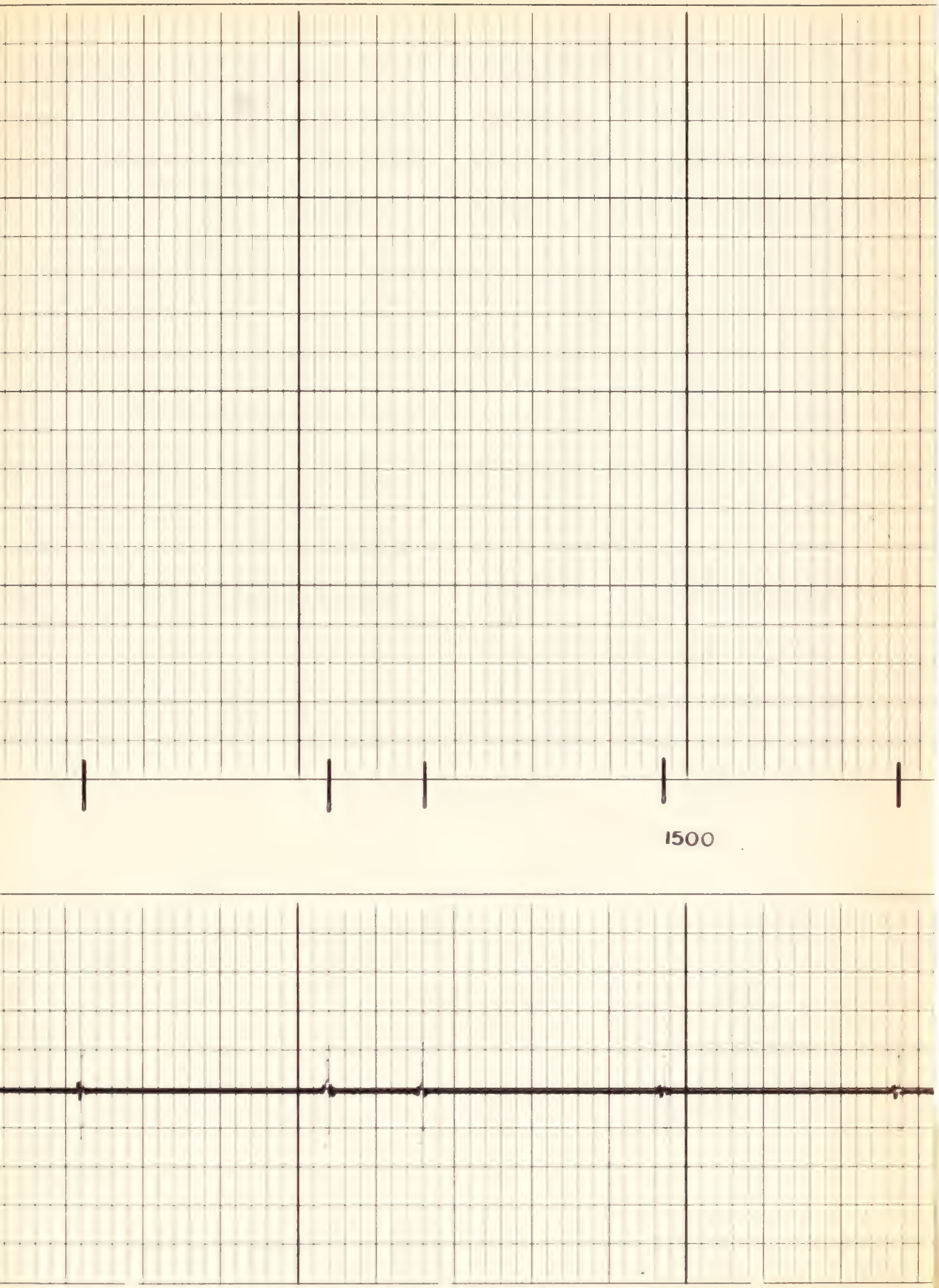

1300
1400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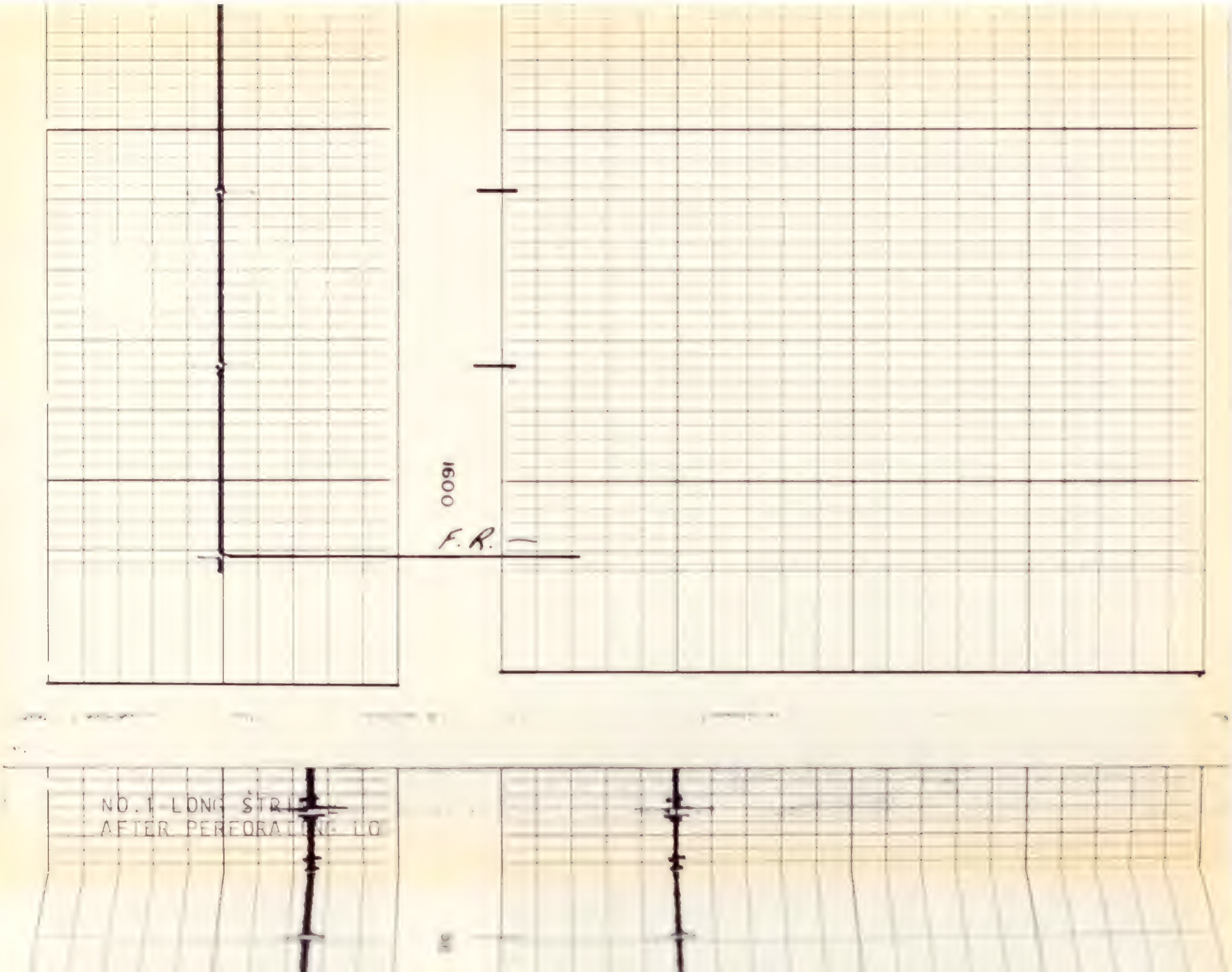
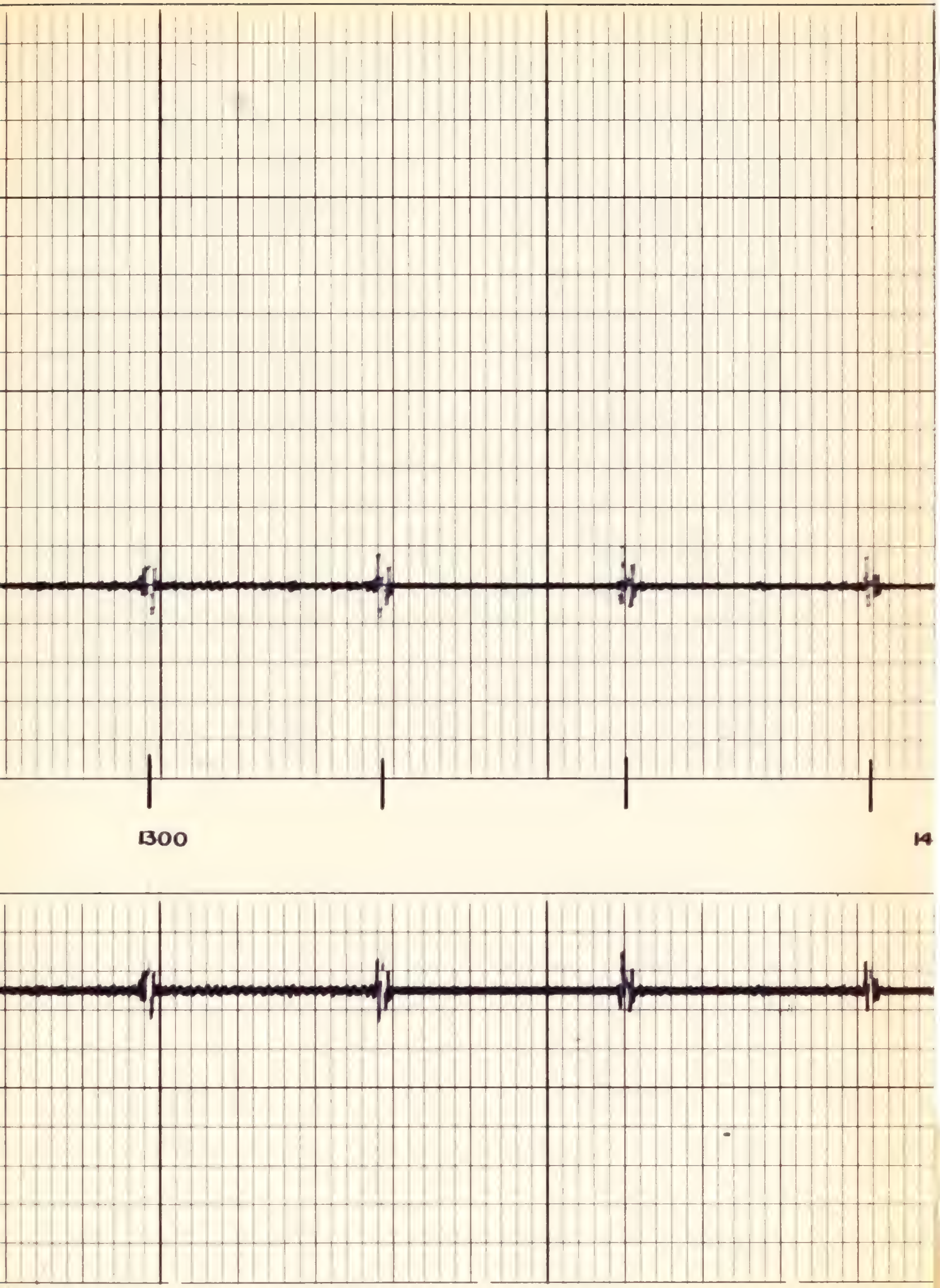
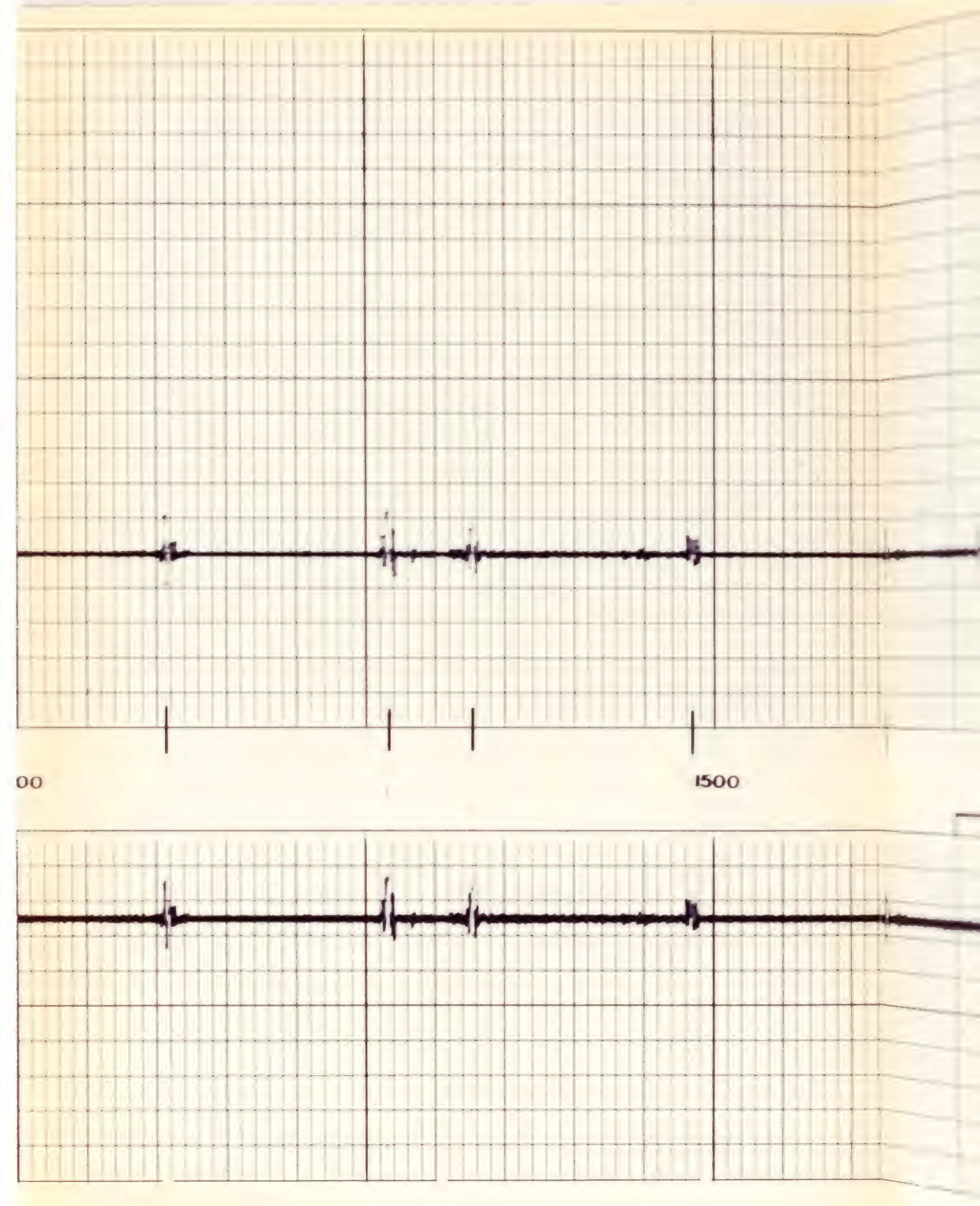
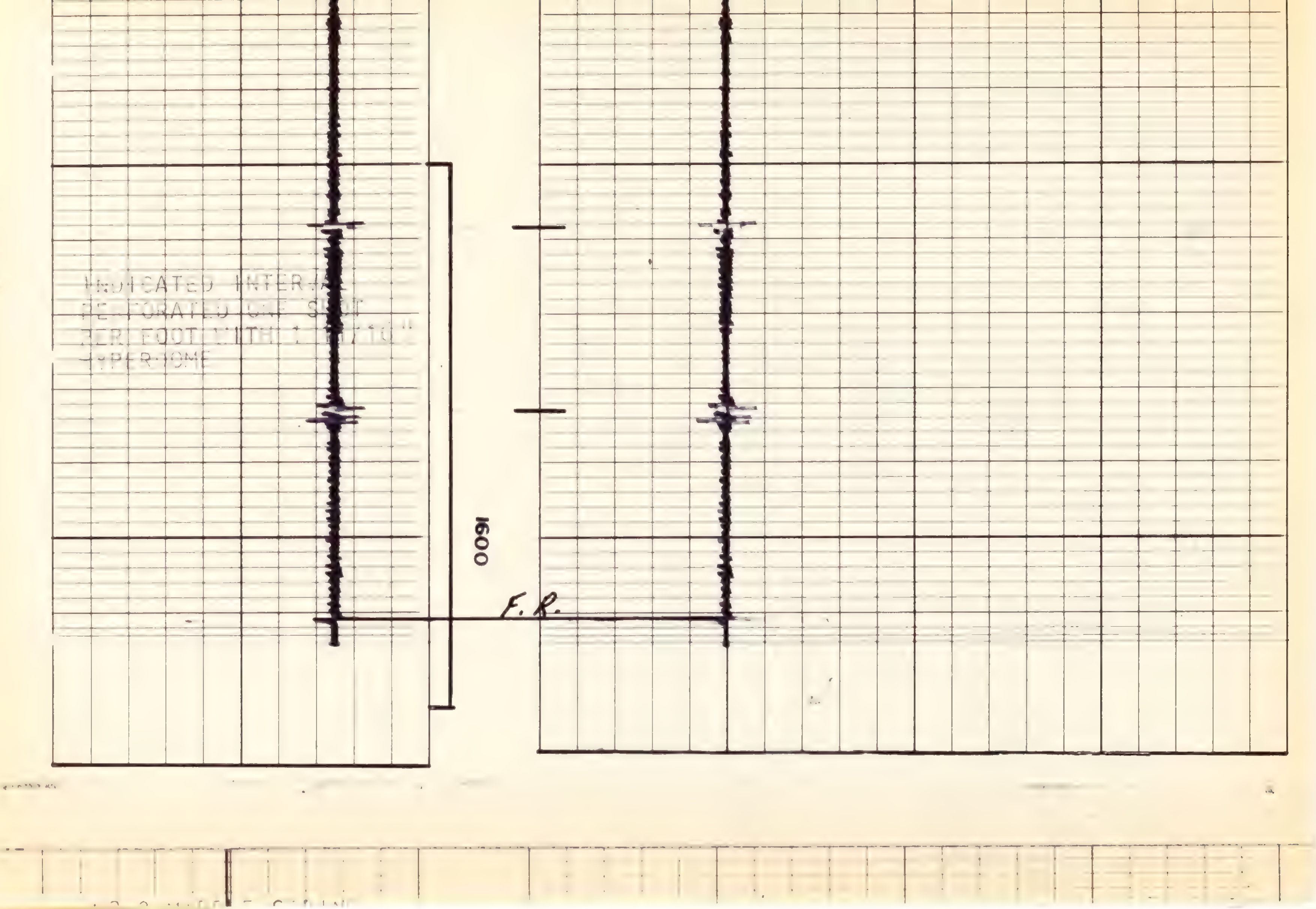
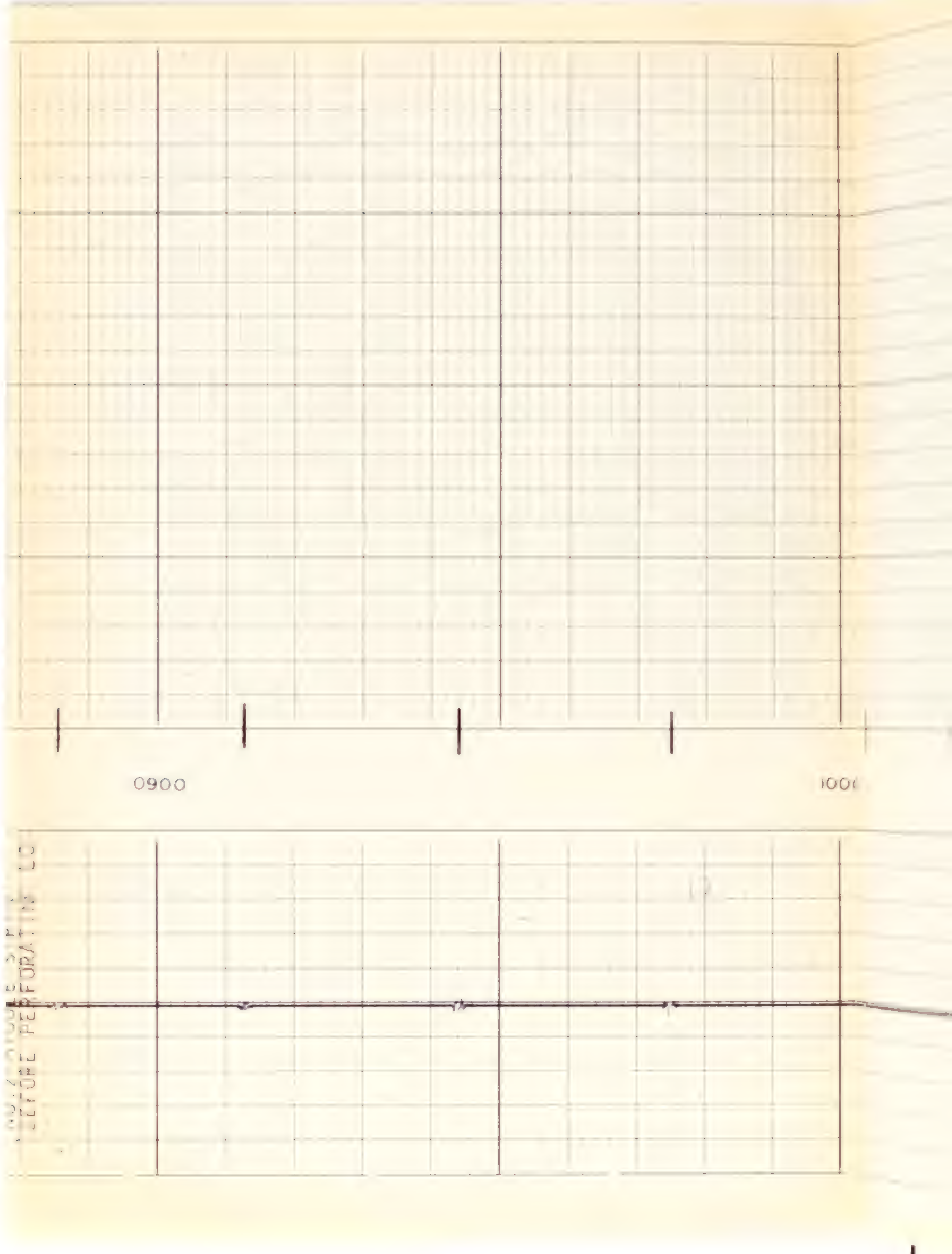
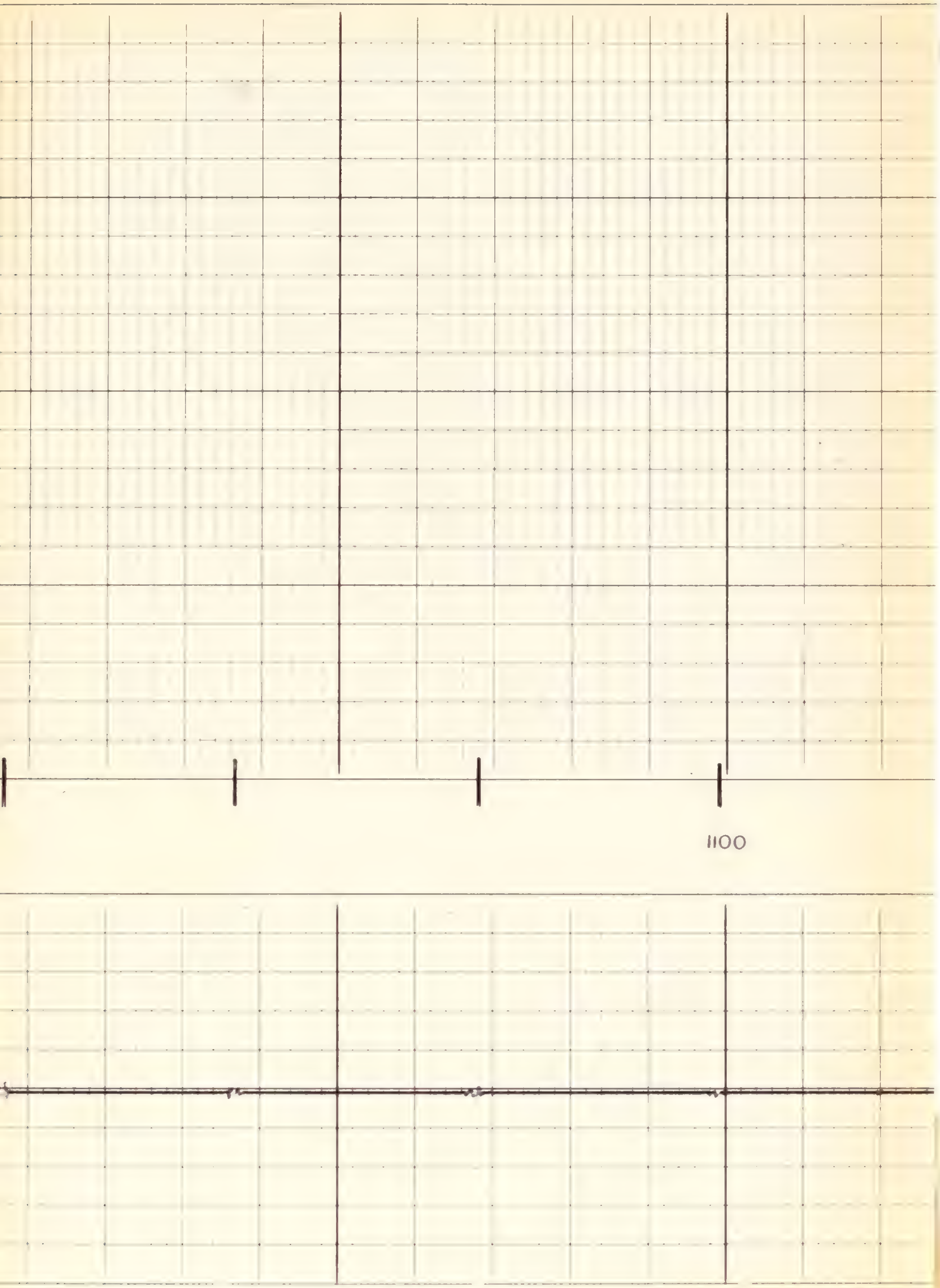

1600
F.R.
NO. 1 LONG STRI
AFTER PERFORATI LO


1300
14


00
1500


INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPER-DOME


0900
BEFORE PERFORATING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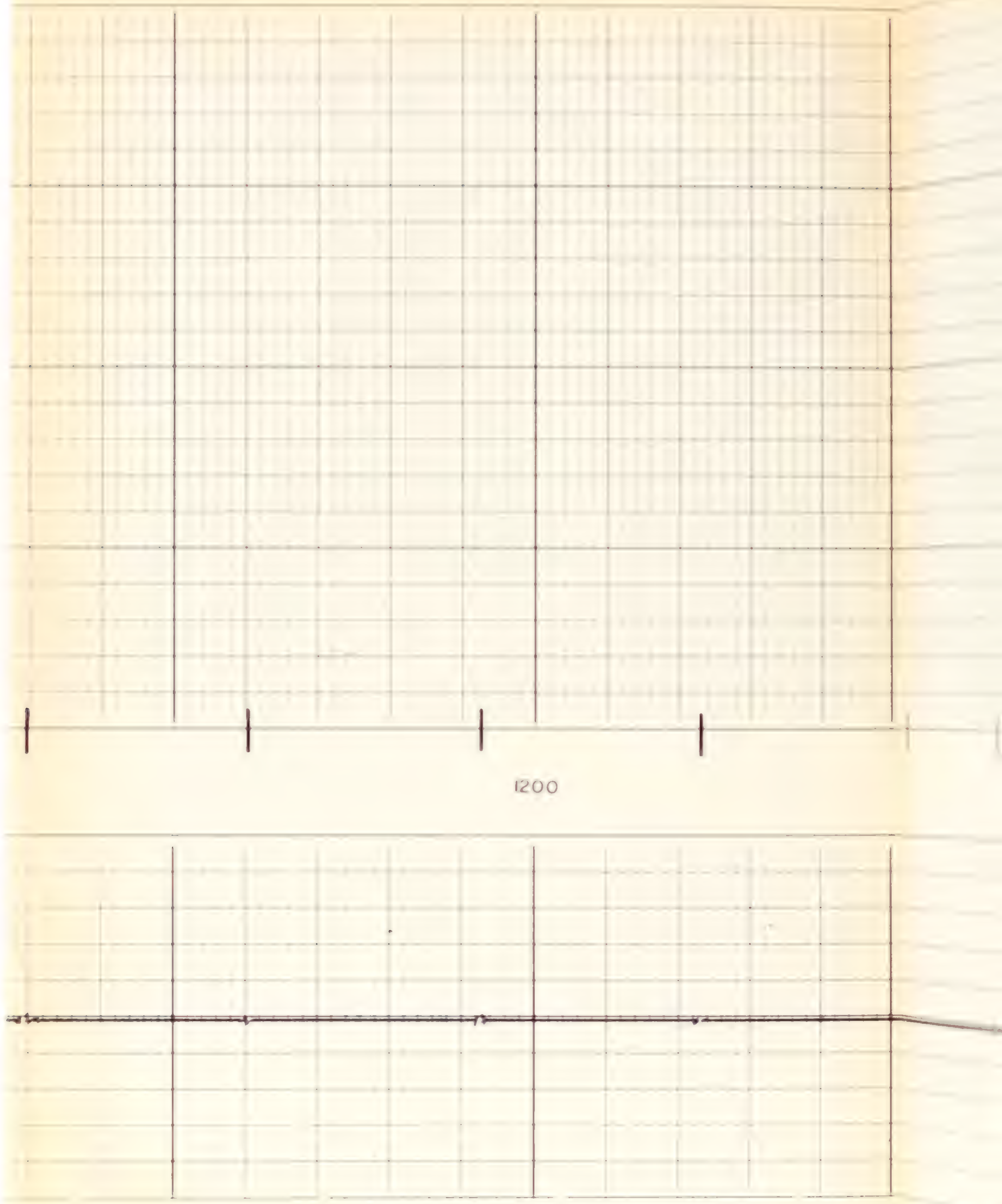
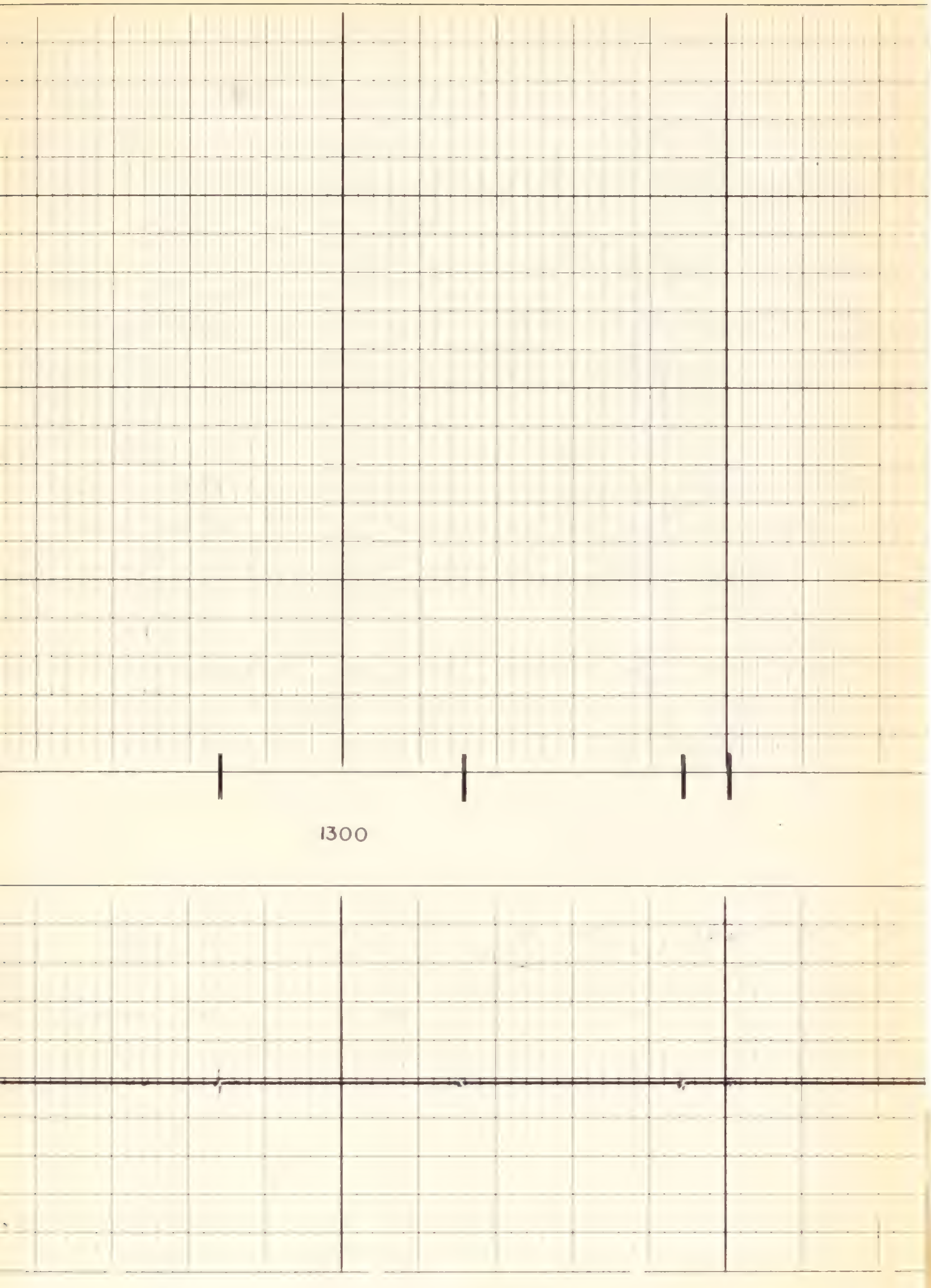

1200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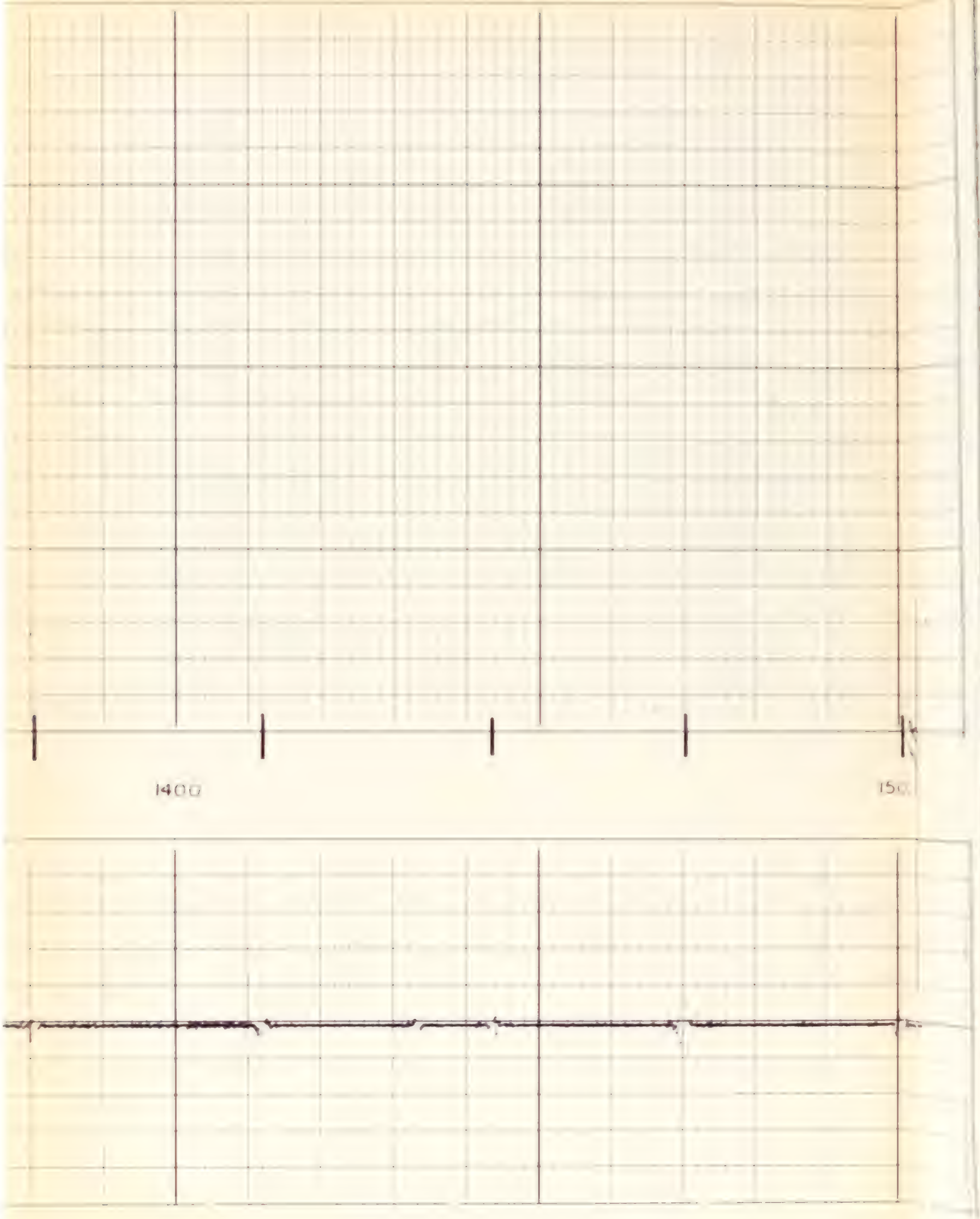
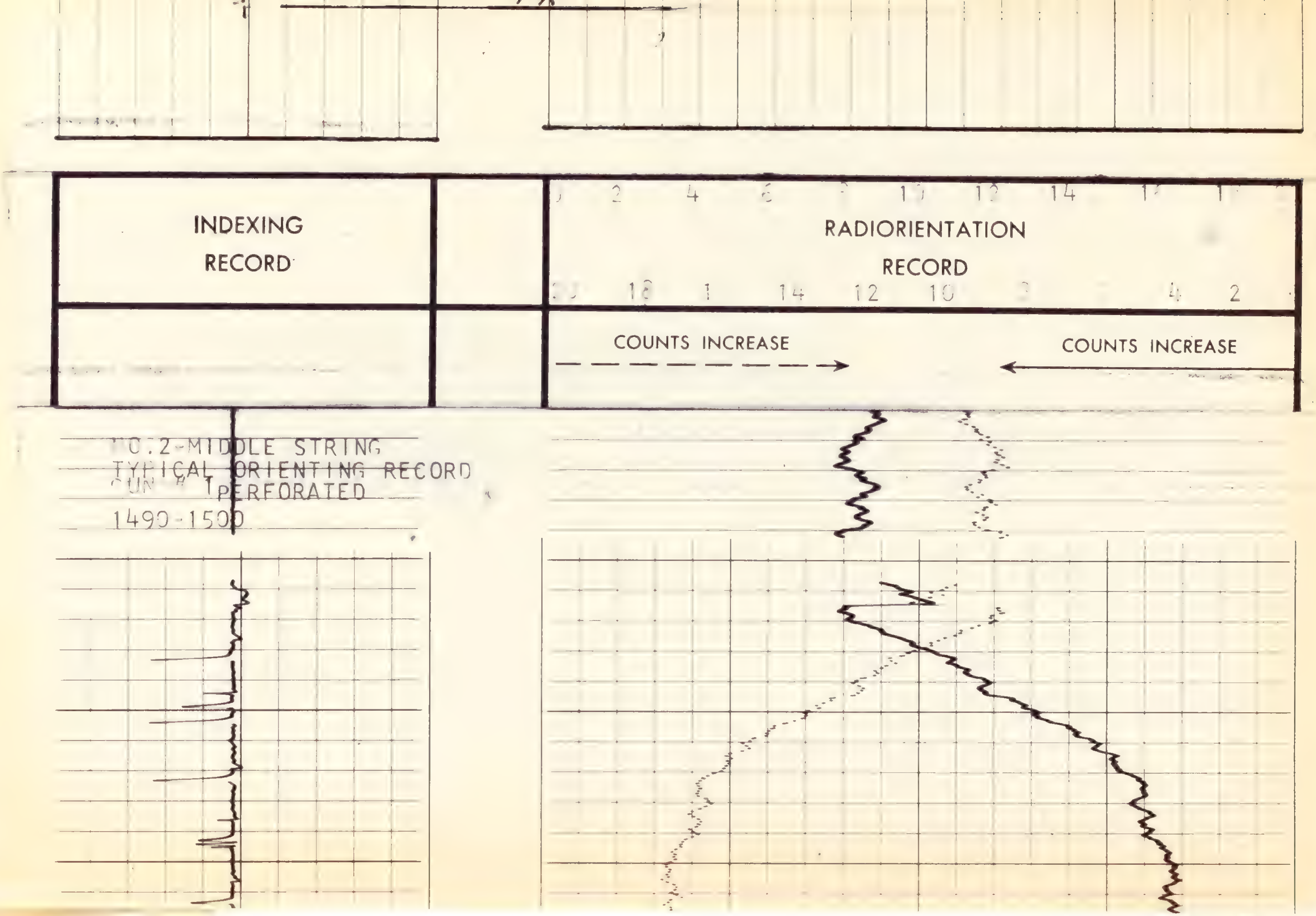
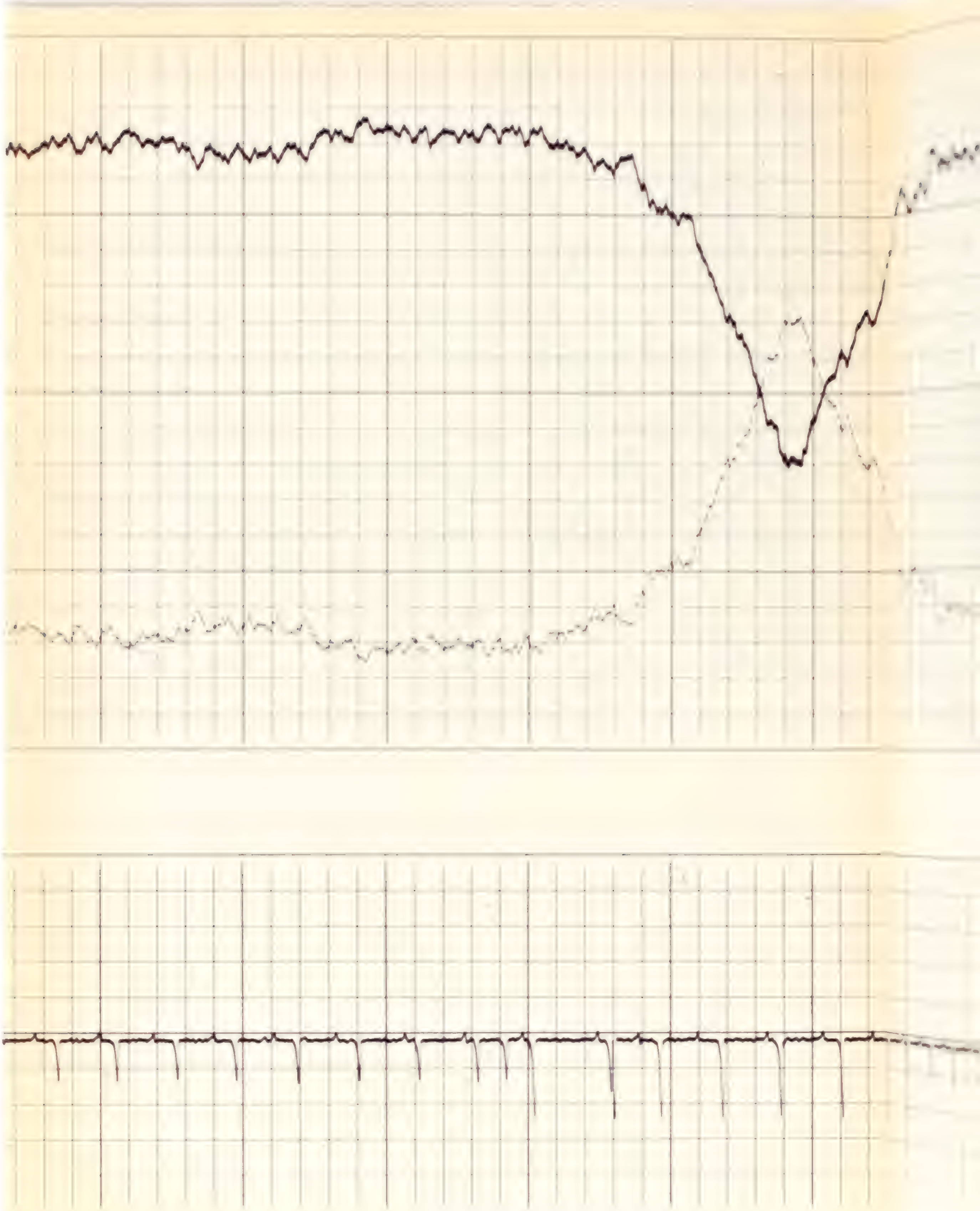
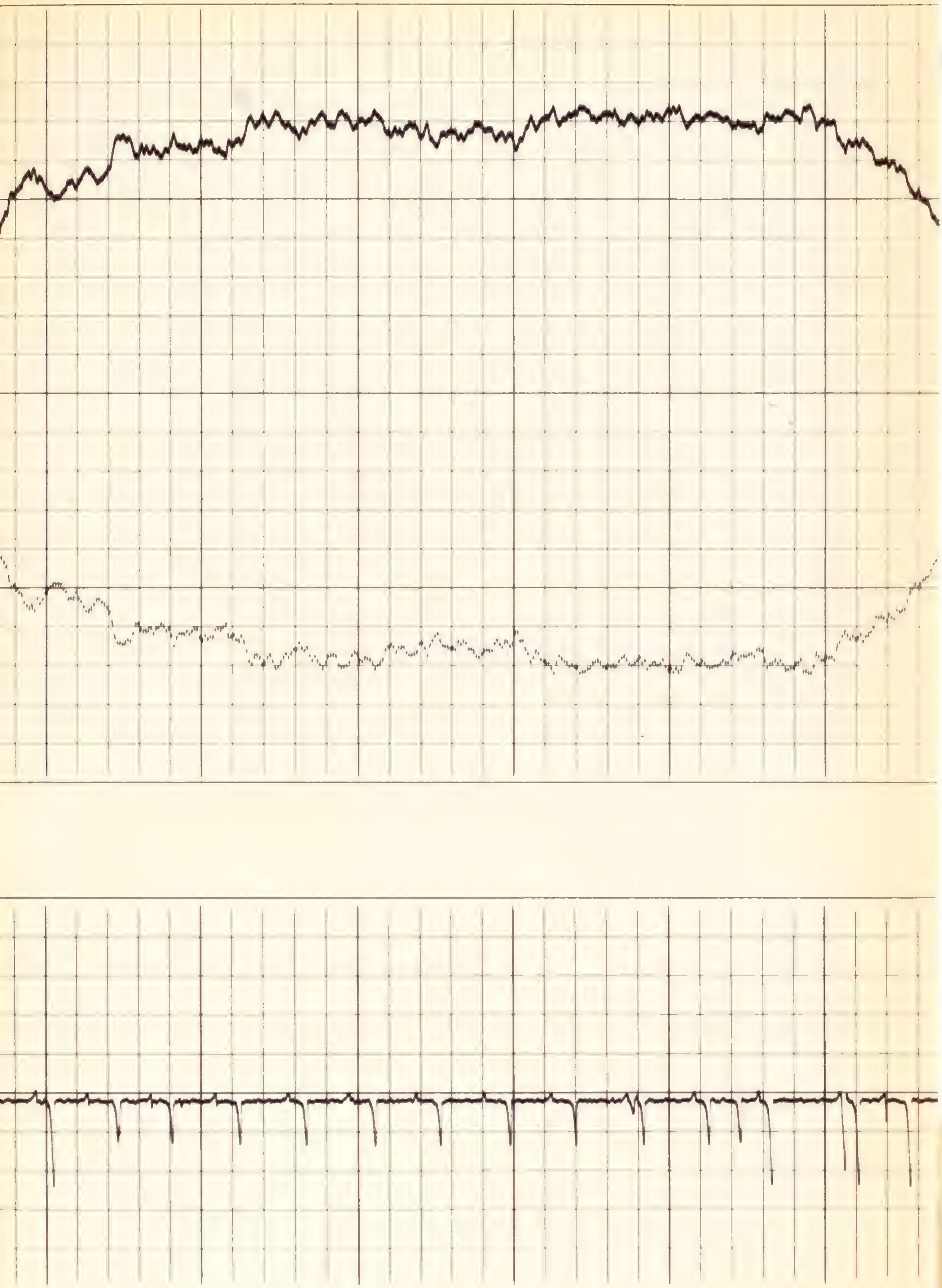
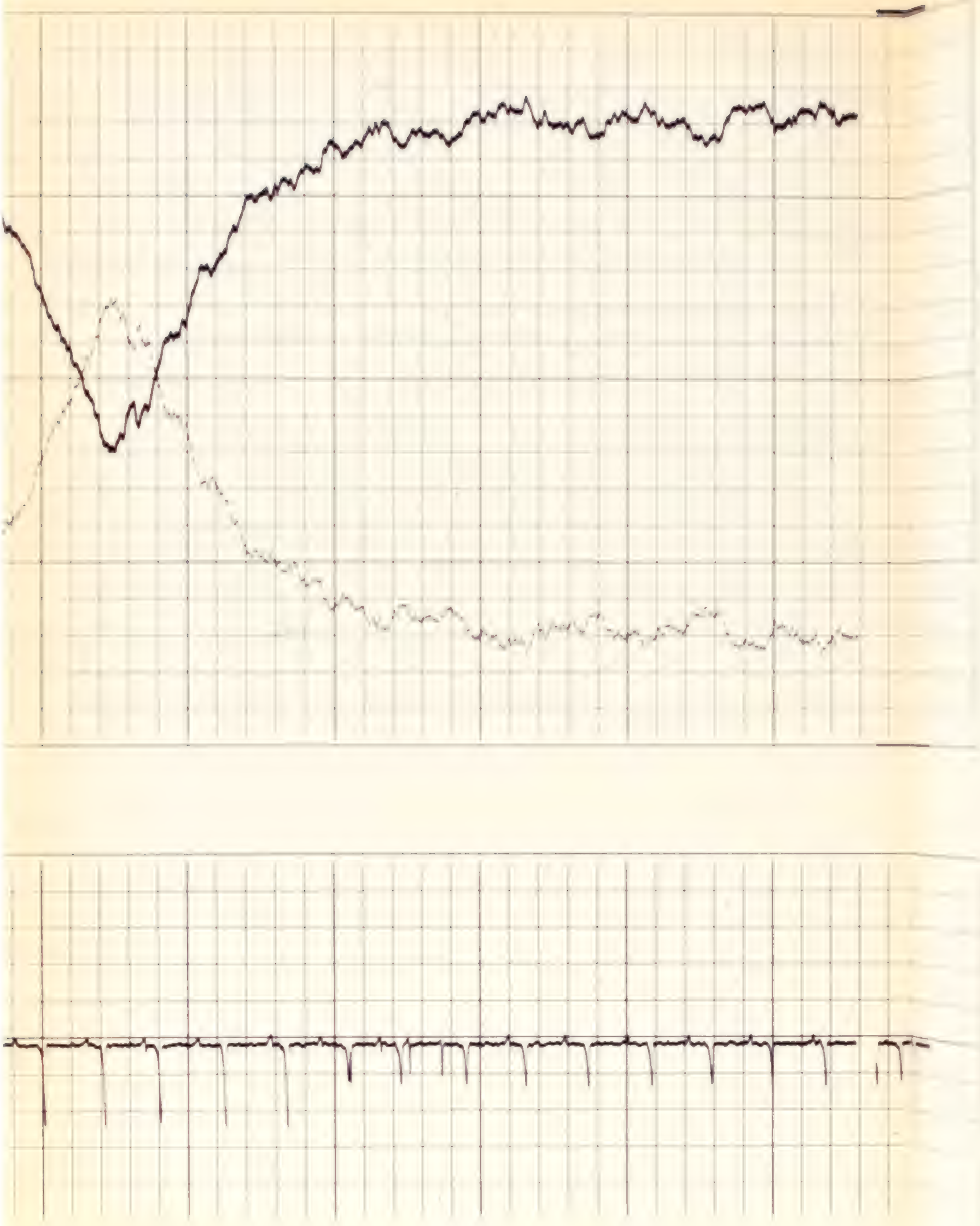

1400
150



NO.2-MIDDLE STRING
TYPICAL ORIENTING RECORD
GUN # 1 PERFORATED
1490-1500



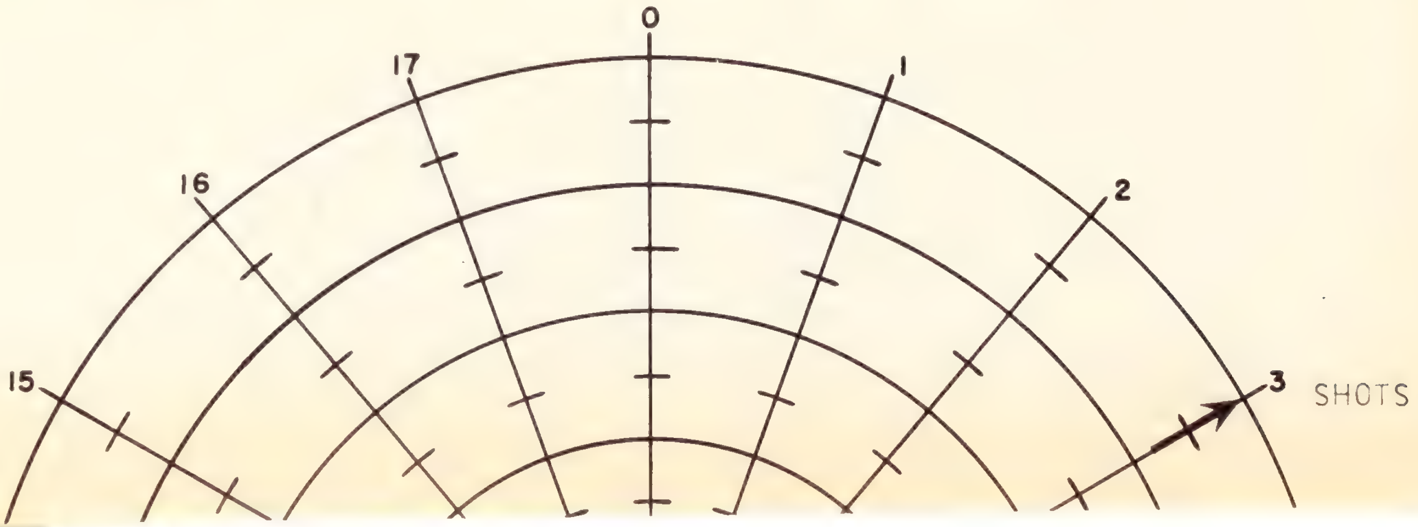


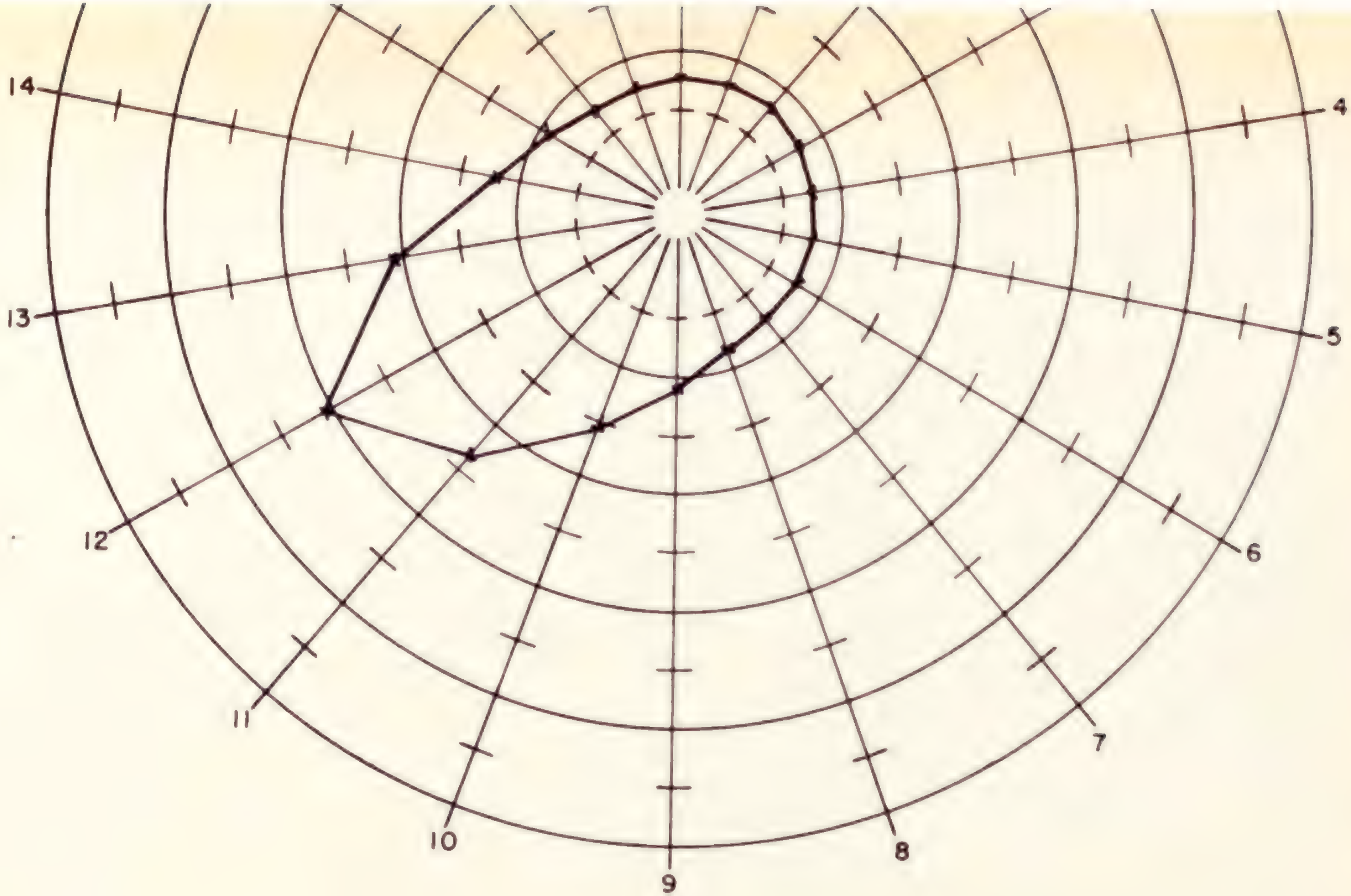


RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1490-1500 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


0
1
2
3
15
16
17
SHOTS



This chart, computation and or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with but subject to the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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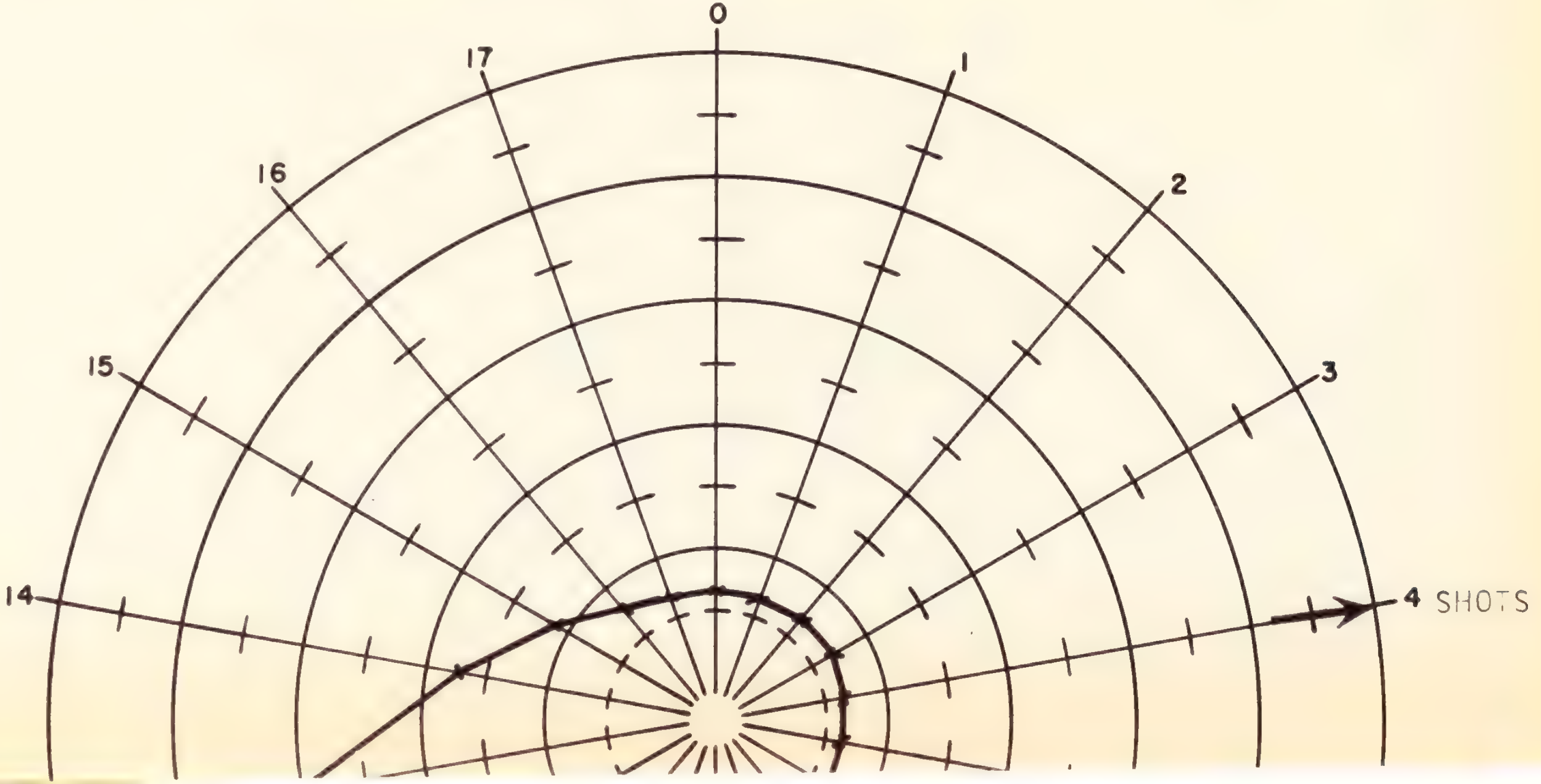
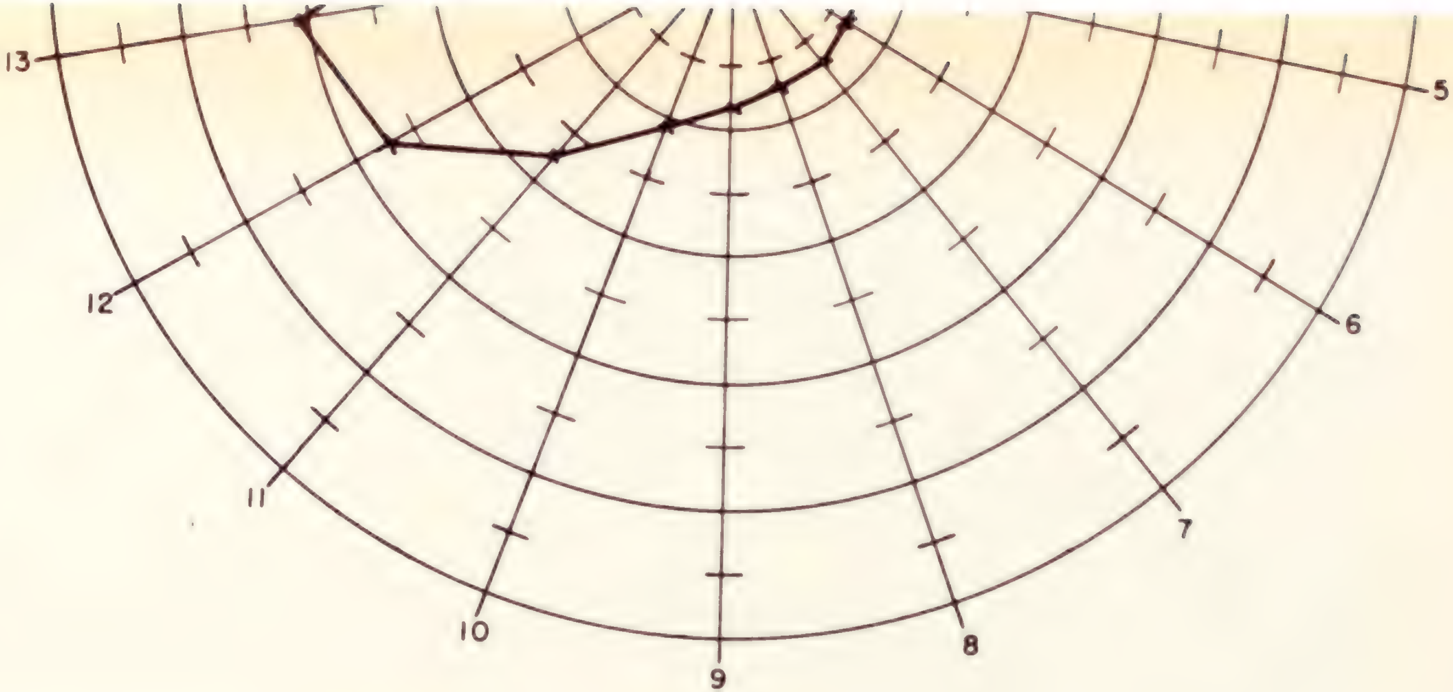
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1479 1489 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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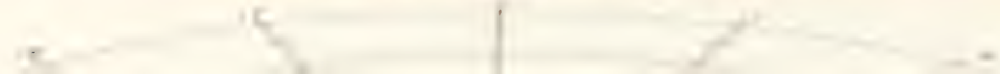
Schlumberger

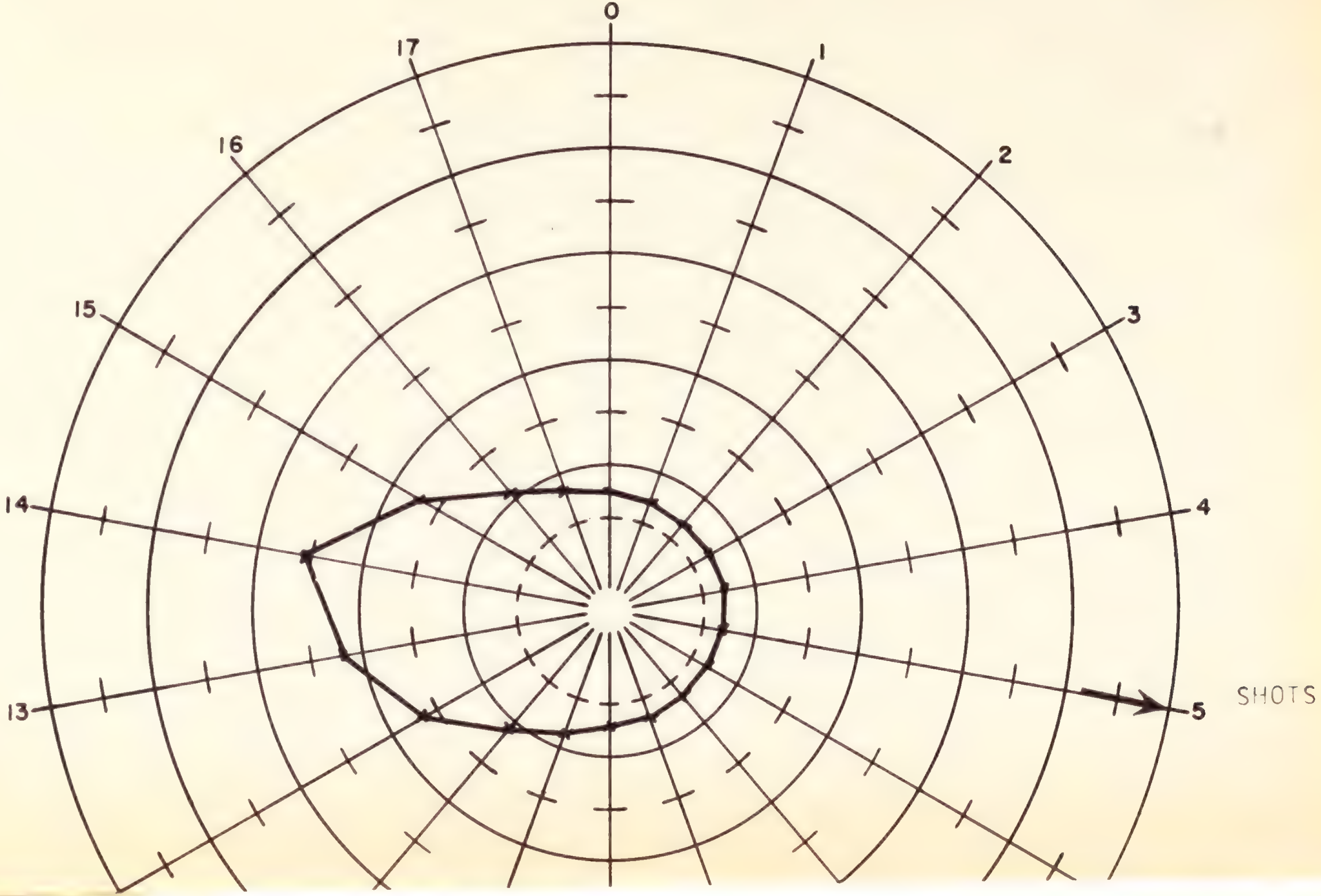
RADIORIENTATION PLOT

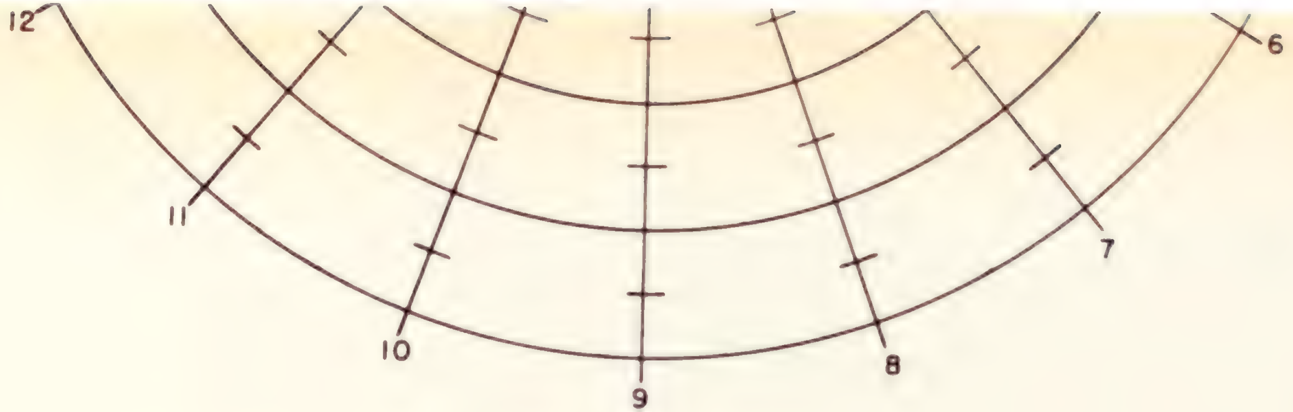


RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1468-1478 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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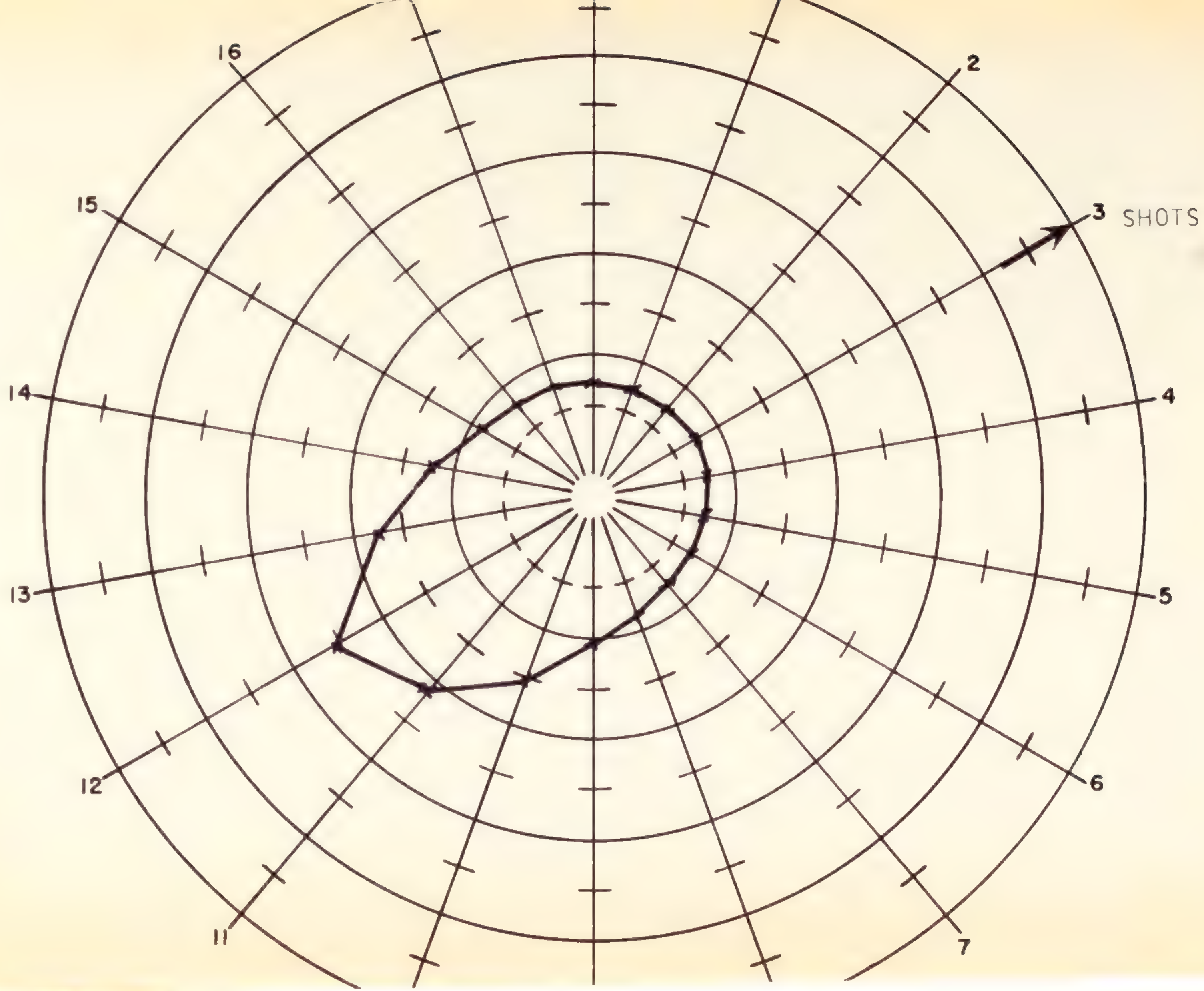
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1457-1467 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


16
2
15
3 SHOTS
14
4
13
5
12
6
11
7

This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are to be set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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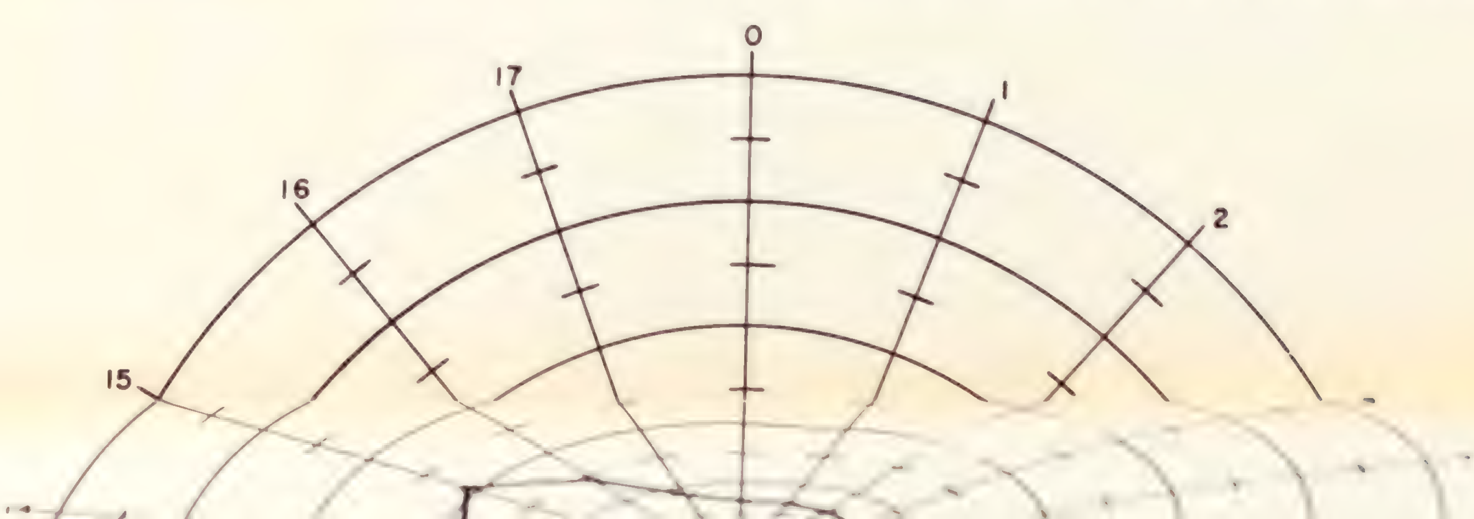
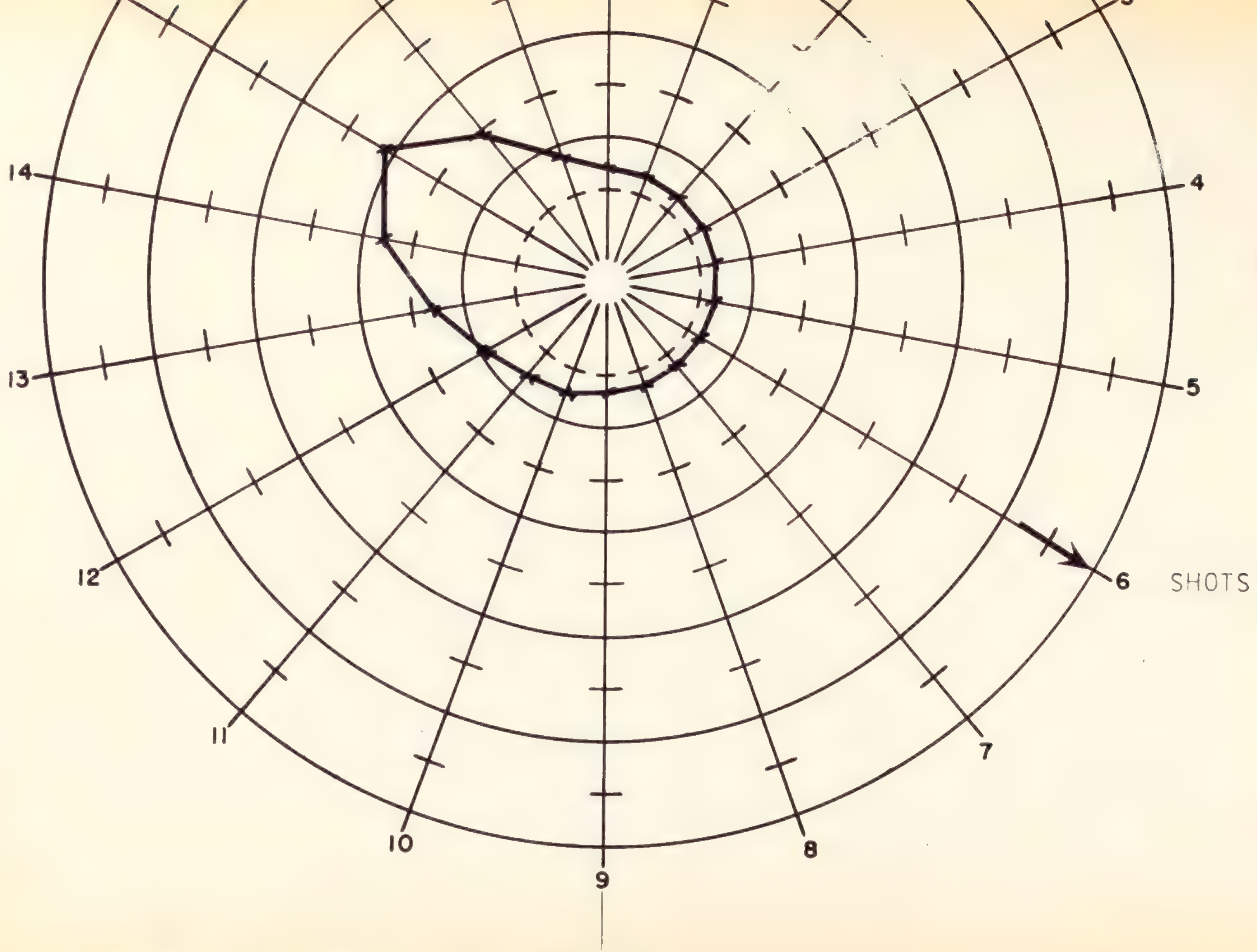
RADIORIENTATION PLOT

POT-B

NO.2 (MIDDLE STRING) PERFORATED 1446-1496 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse

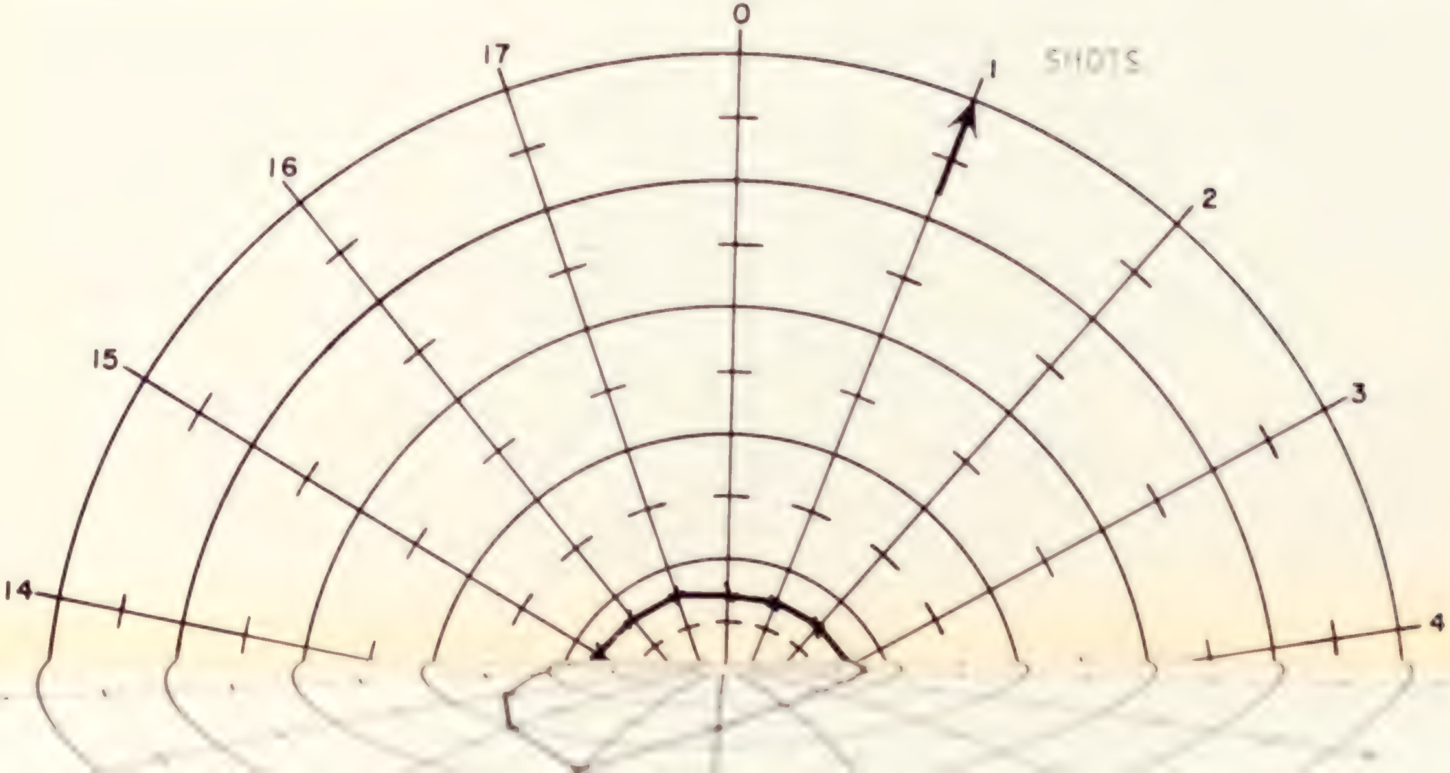
[illegible] for this job. The readings could be adversely affected by [illegible]
drill hole and other conditions unknown to us

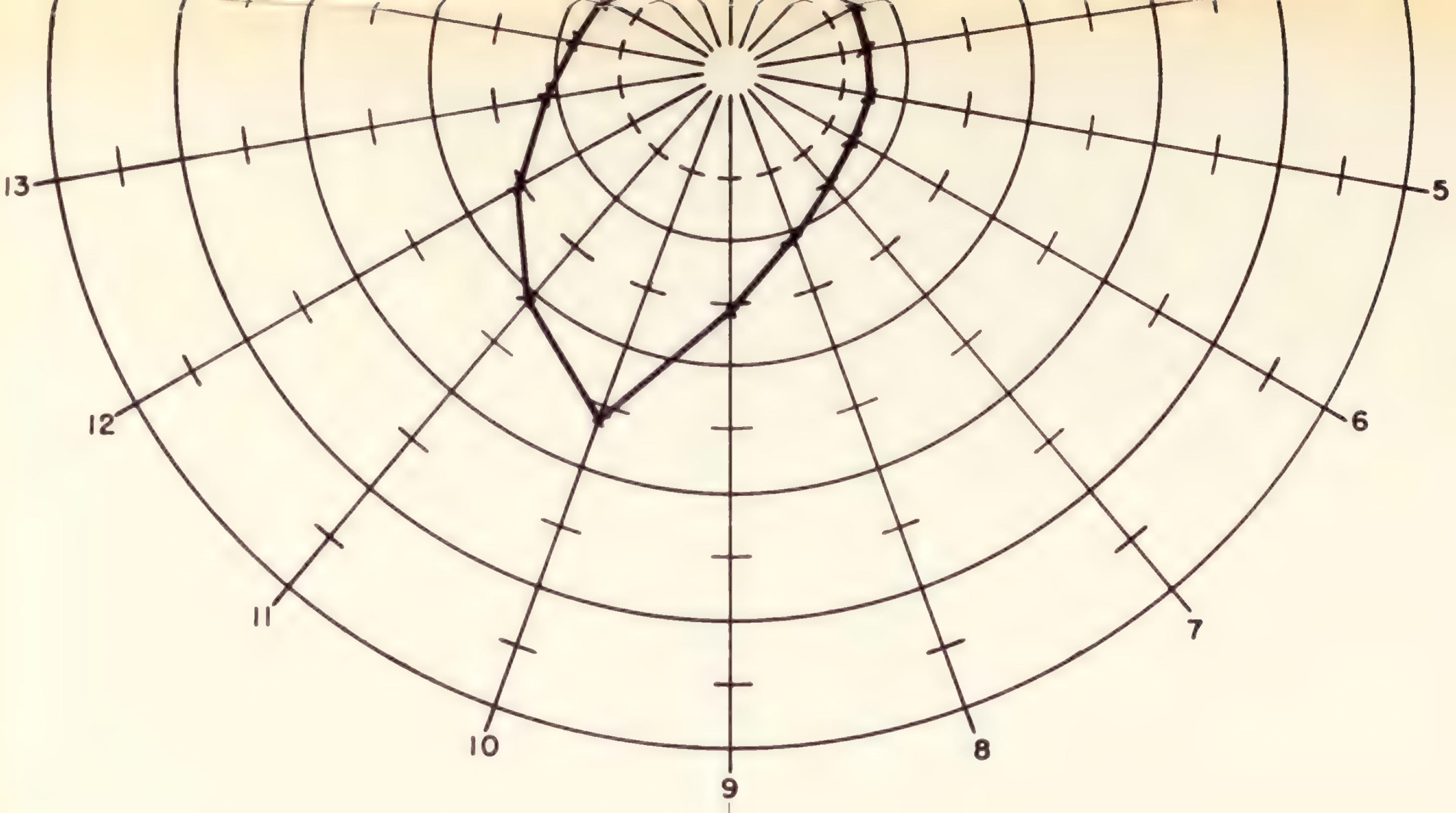
Schlumberger

RADIORIENTATION PLOT

POT-B

5½" MIDDLE STRING PERFORATED 1435'-1445' ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





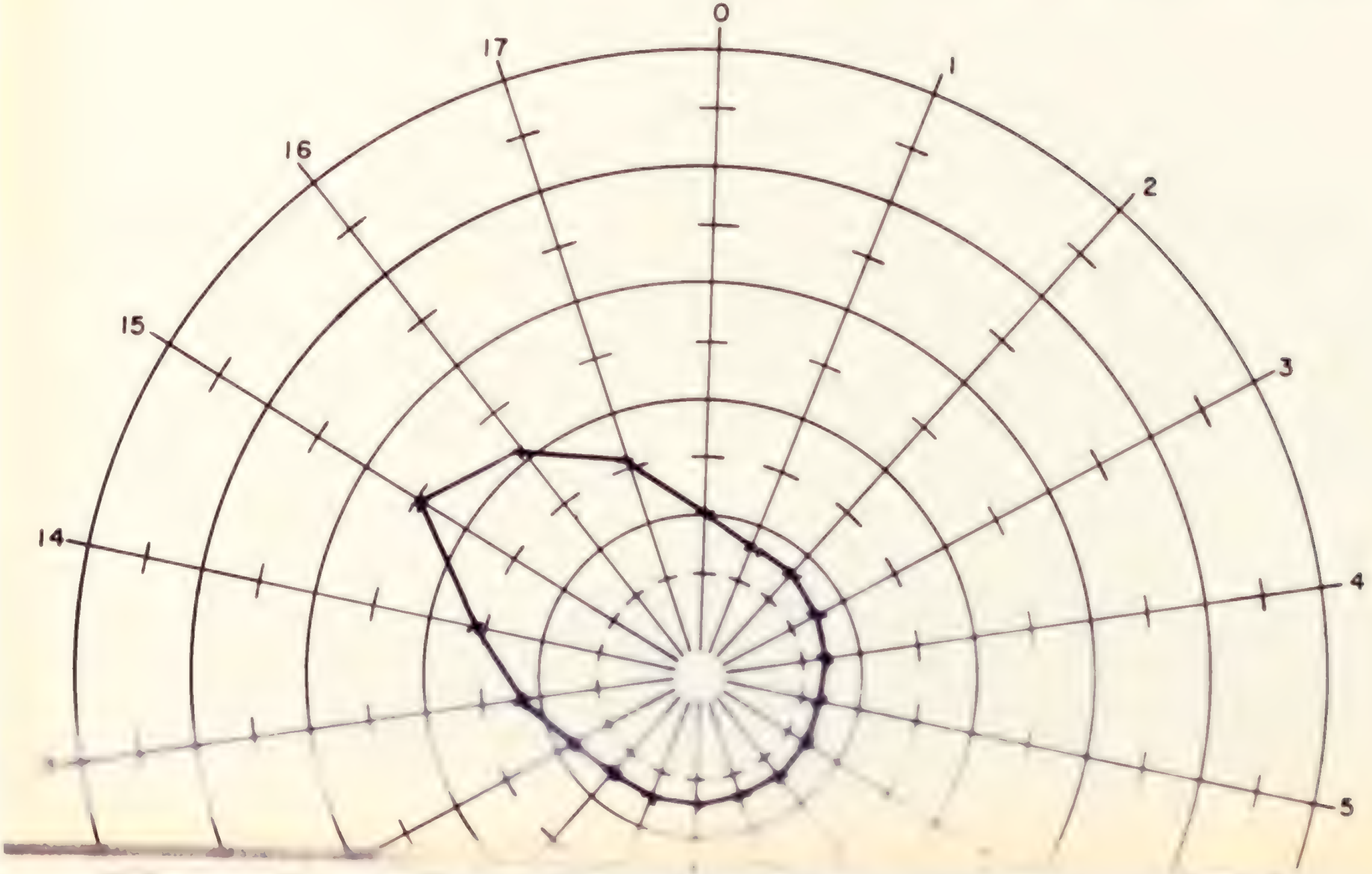
chart, computation and/or interpretation of our readings from our gamma-gamma orientation and de
ing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
of our Service Order for this job. The readings could be adversely affected by vagrant metal in the
hole and other conditions unknown to us.

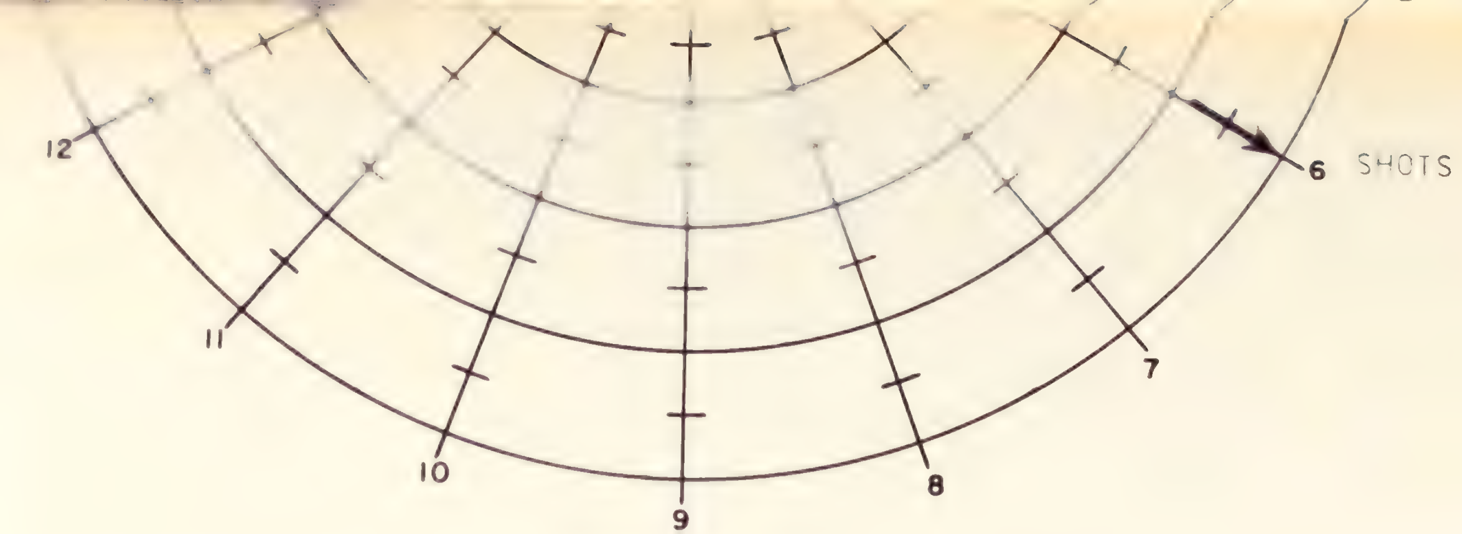
Schlumberger

RADIORIENTATION PLOT

POT-B

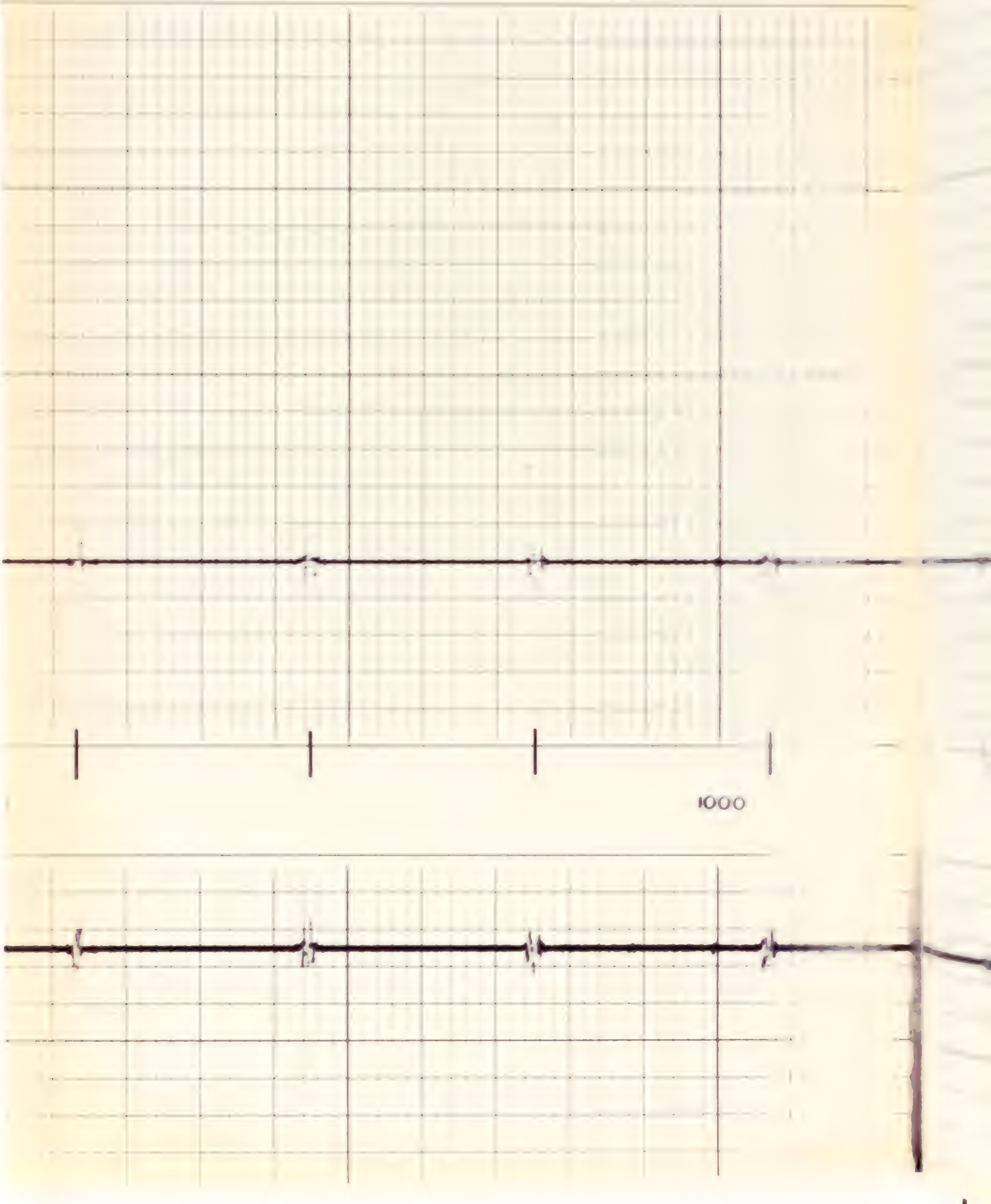
2 MIDDLE STRING PERFORATED 1430-1435 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





nt computation and or interpretation of our readings from our gamma gamma orientation and de strument is presented to you in accordance with but subject to the General Terms and Conditions set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse Service Order for this job. The readings could be adversely affected by vagrant metal in the le and other conditions unknown to us

Schlumberger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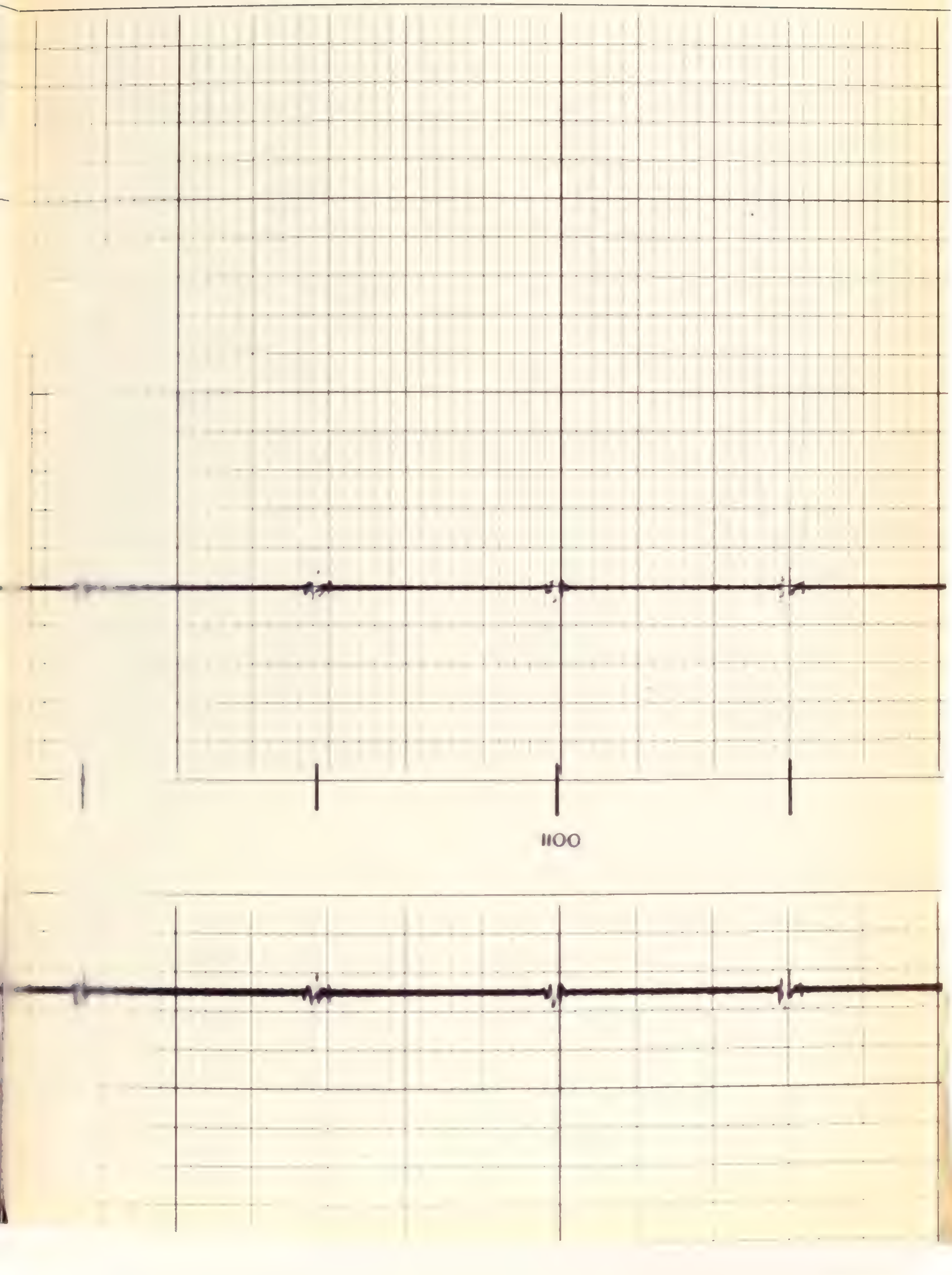
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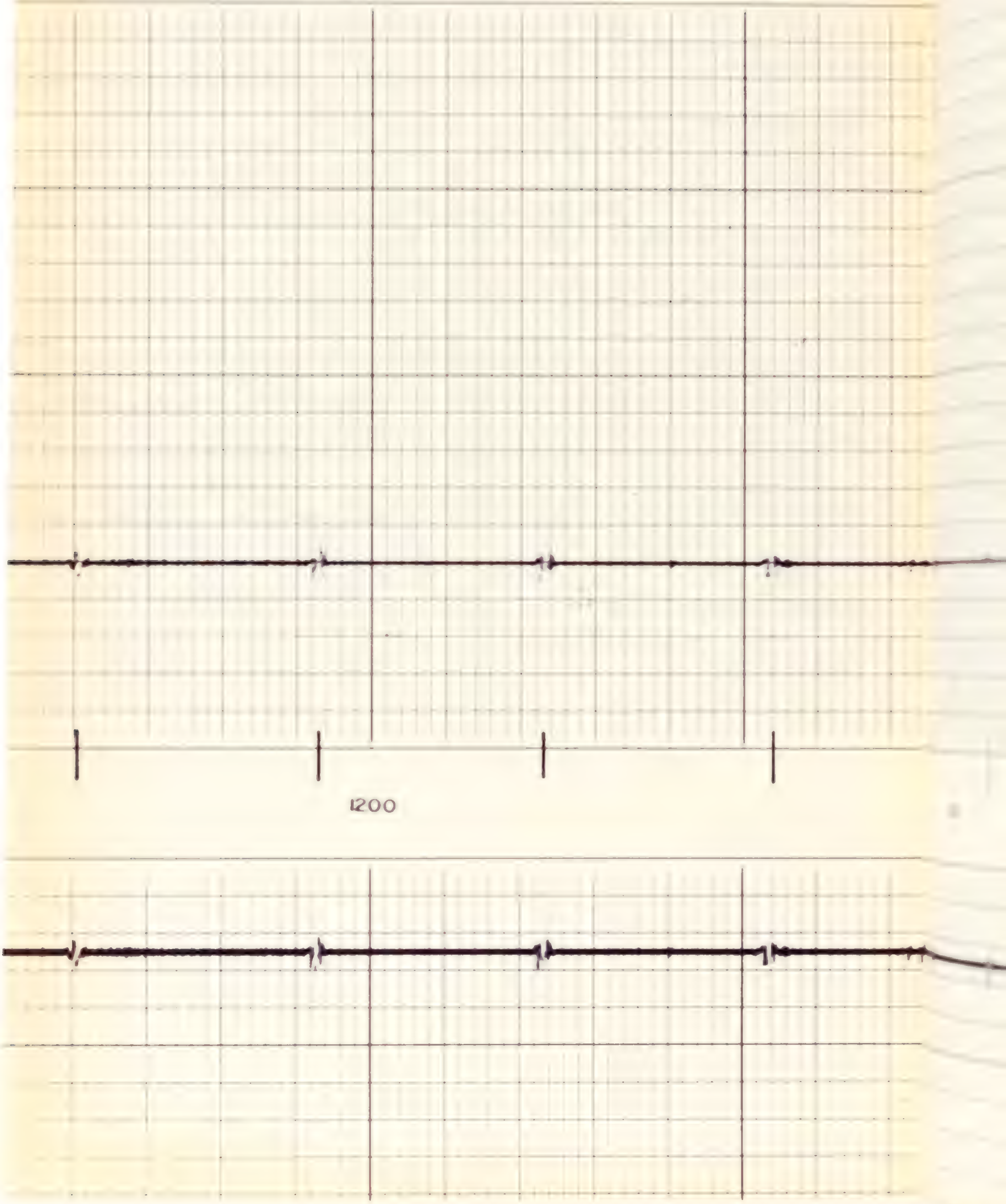
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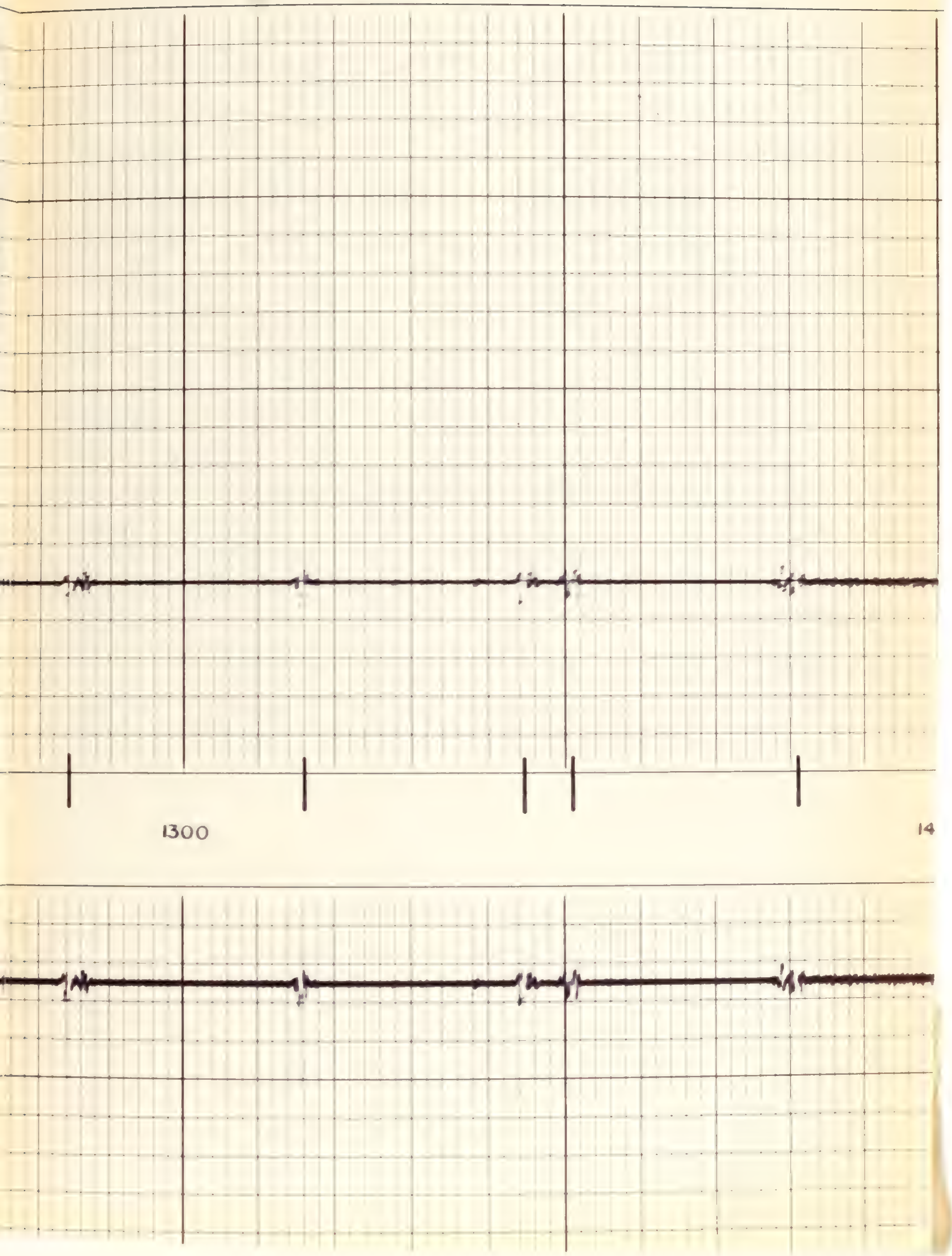
1300
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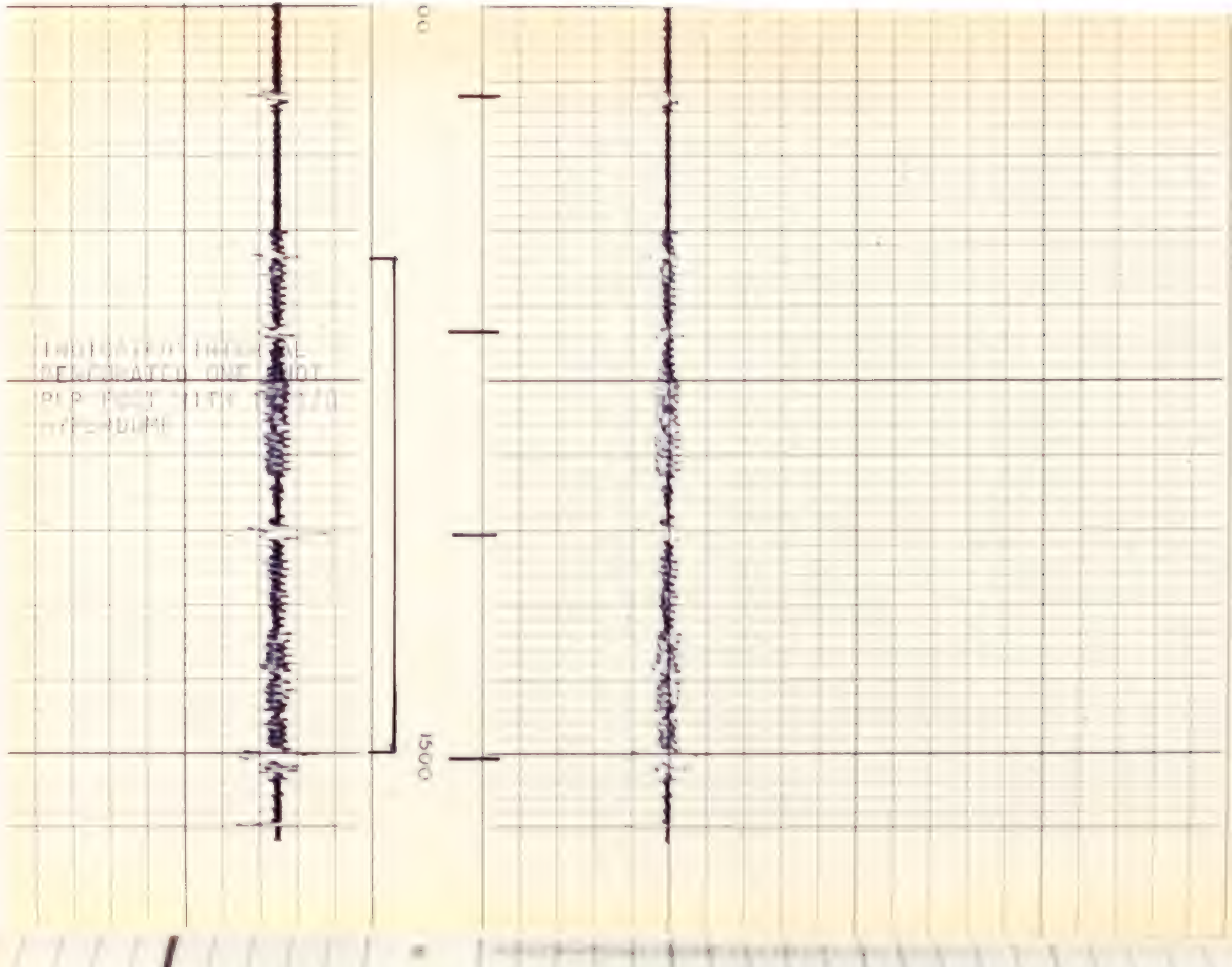
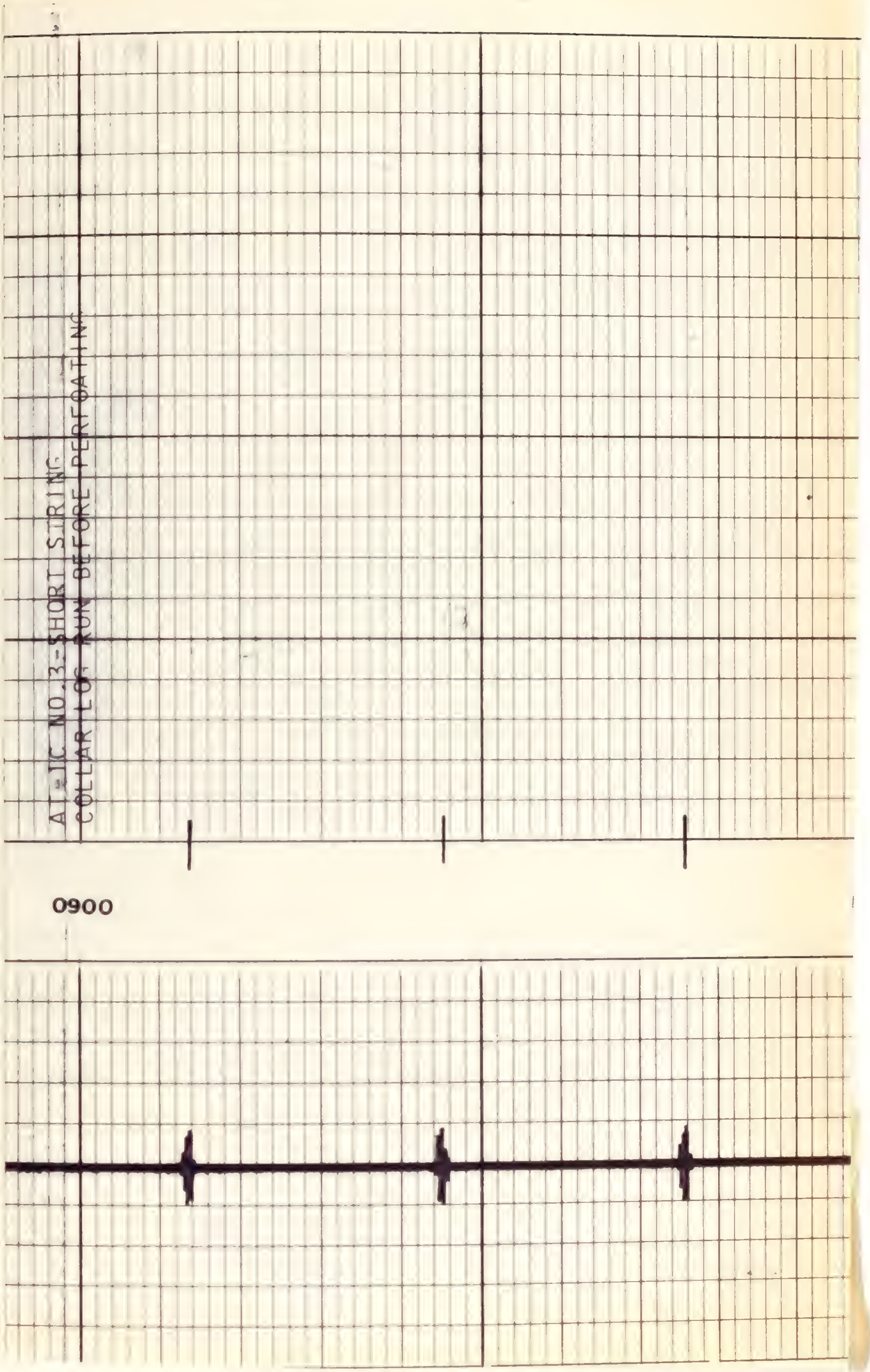
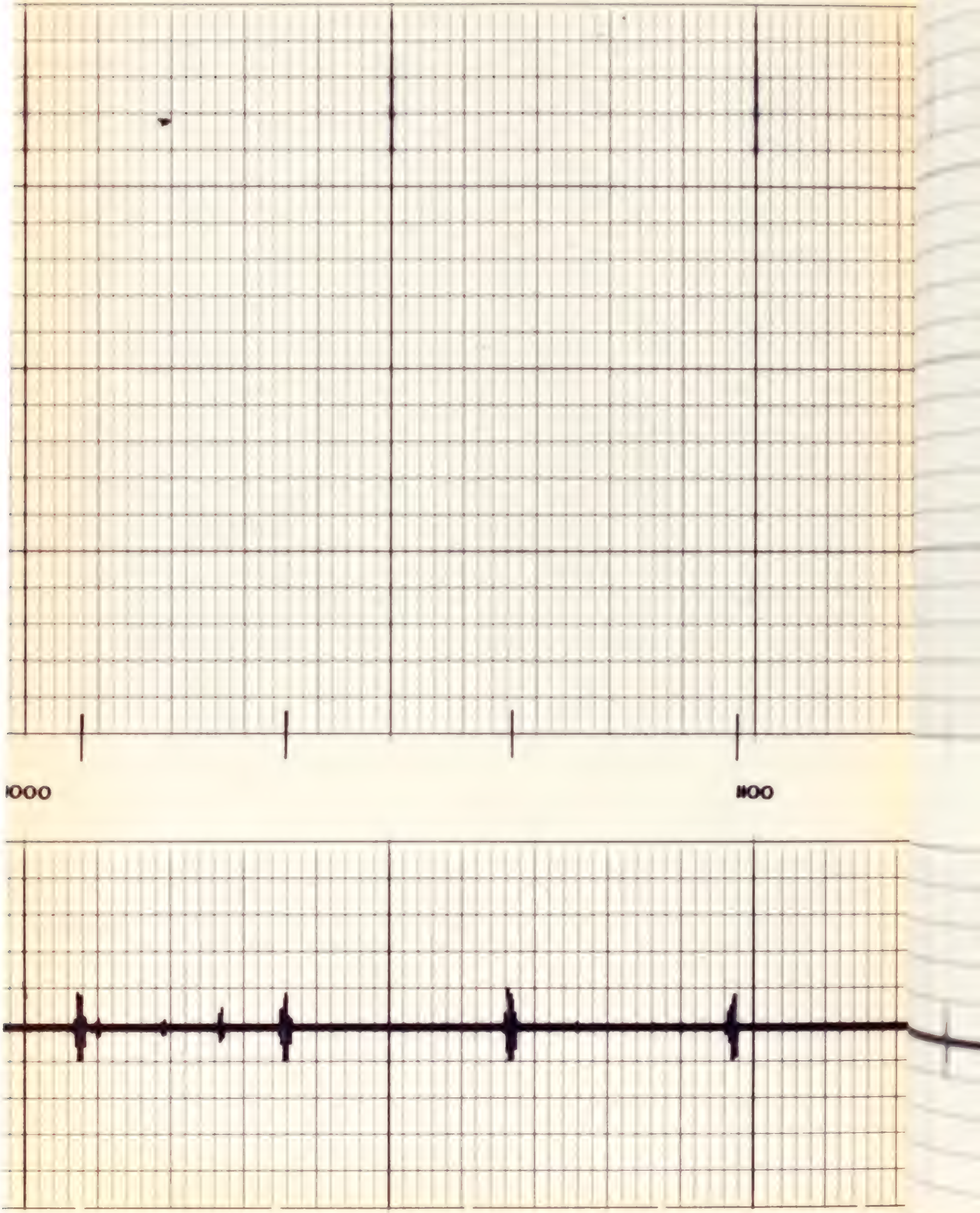
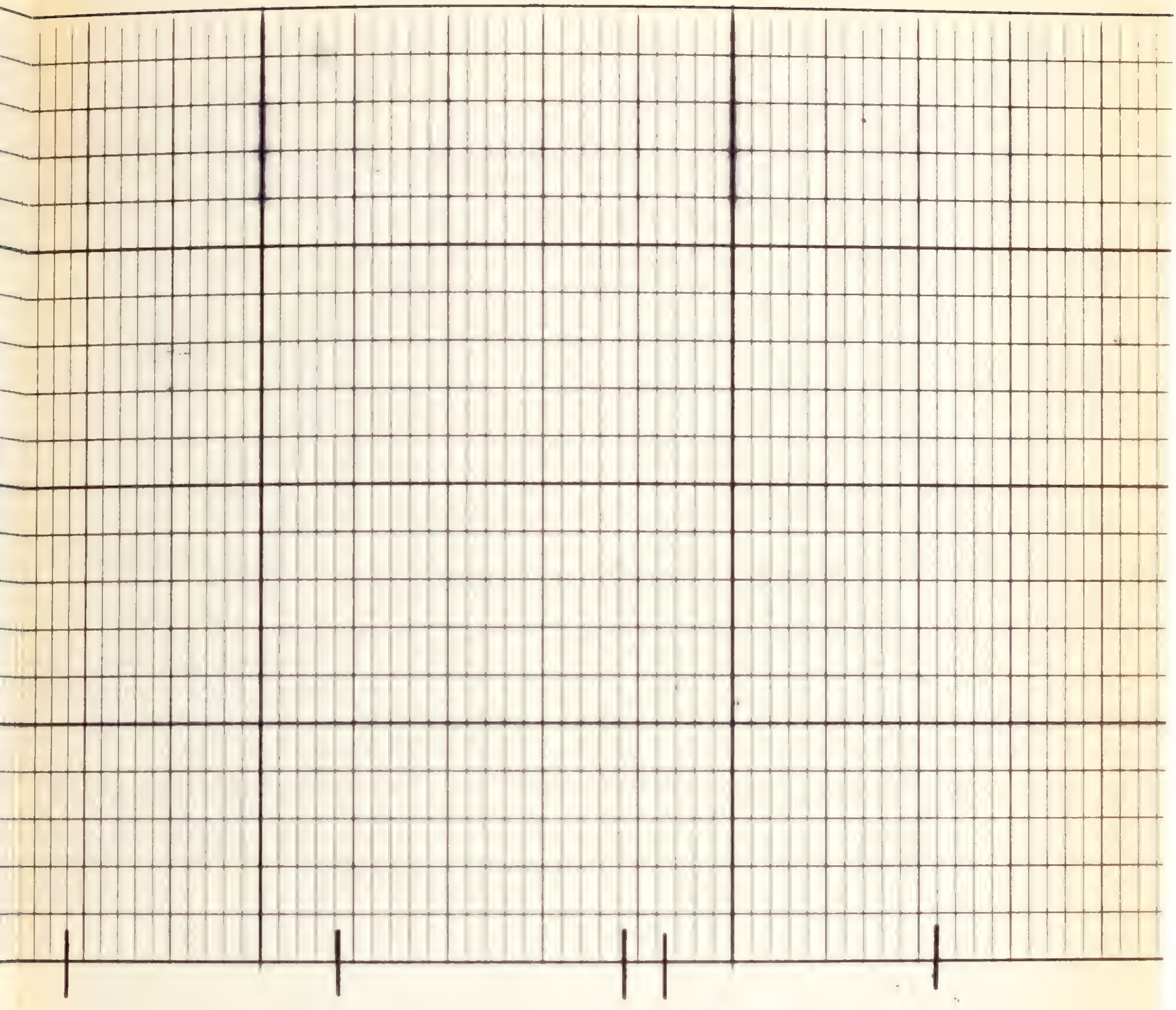
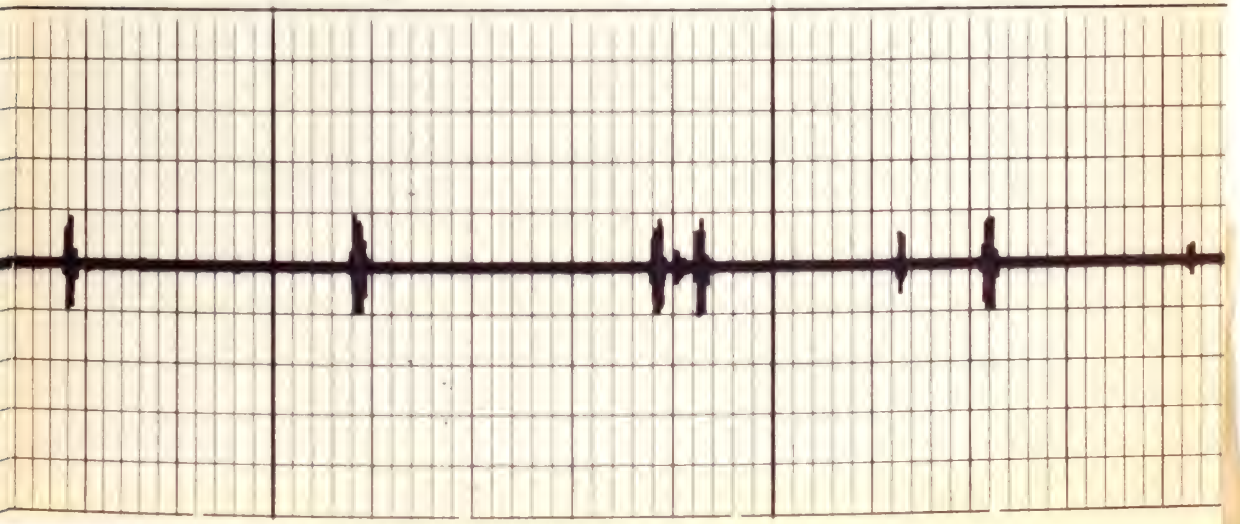

00
1500
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH [illegible]
HYPERDOME

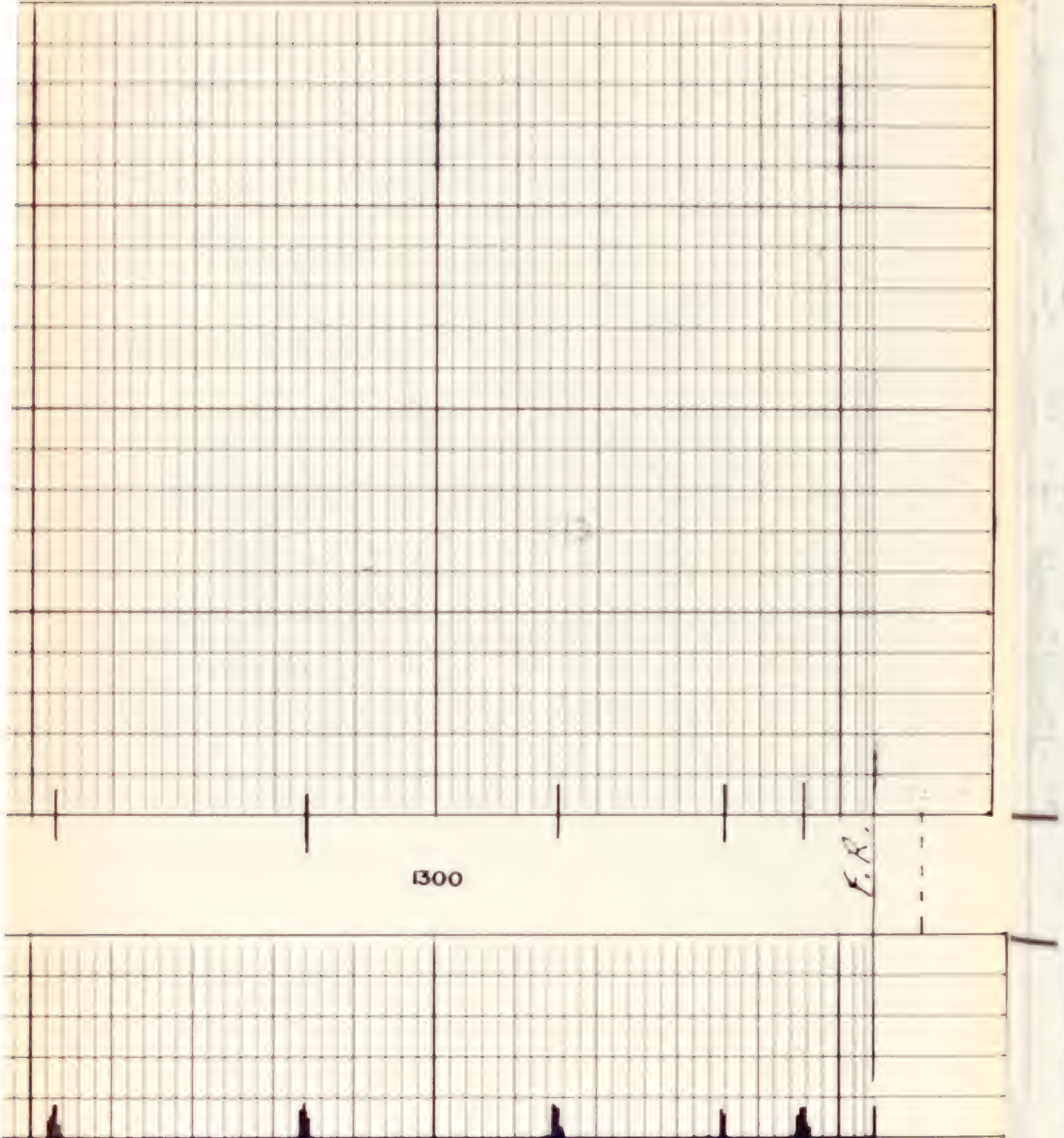

AI JC NO.3-SHORT STRING
COLLAR LOG RUN BEFORE PERFOATING
0900

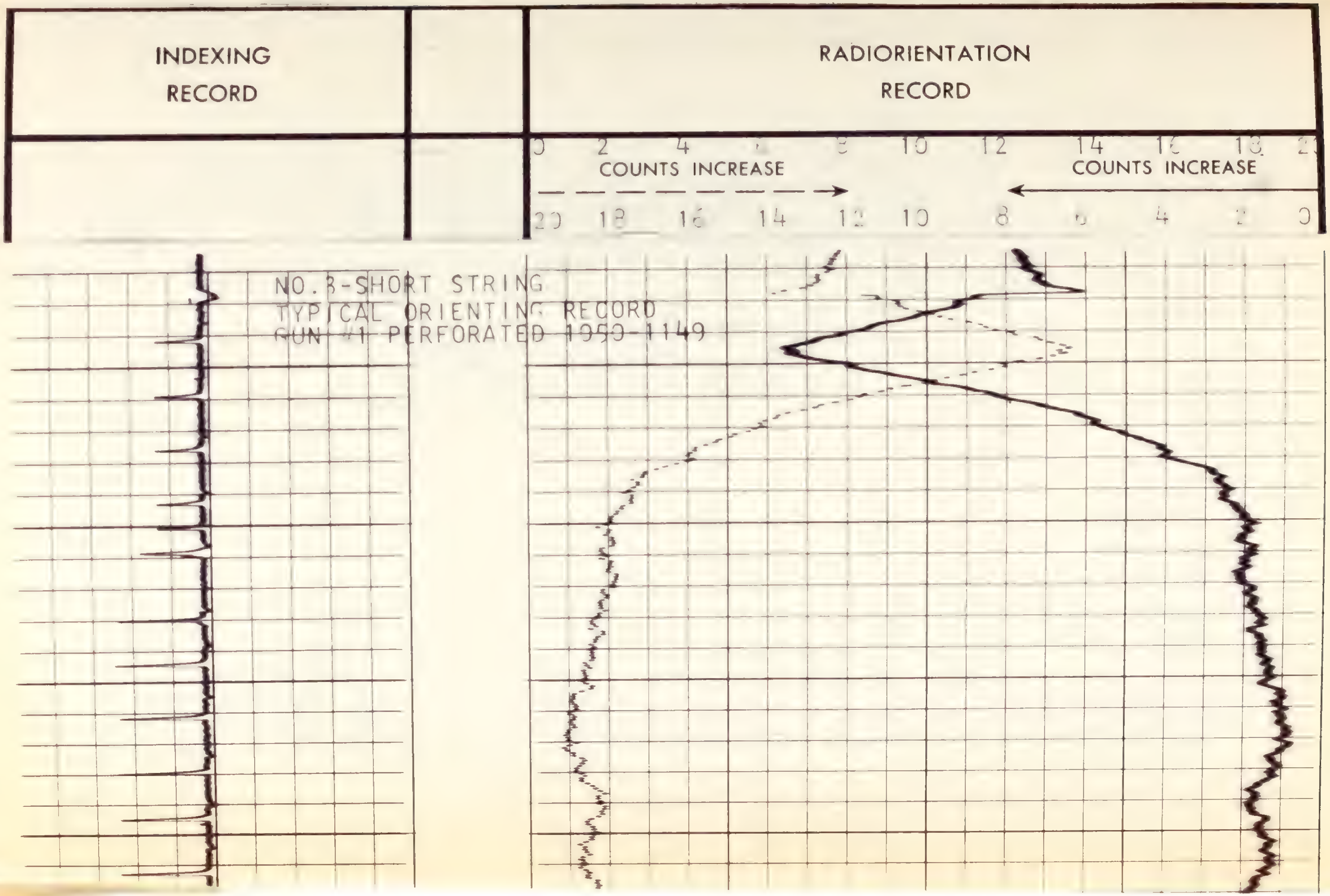

1000
1100



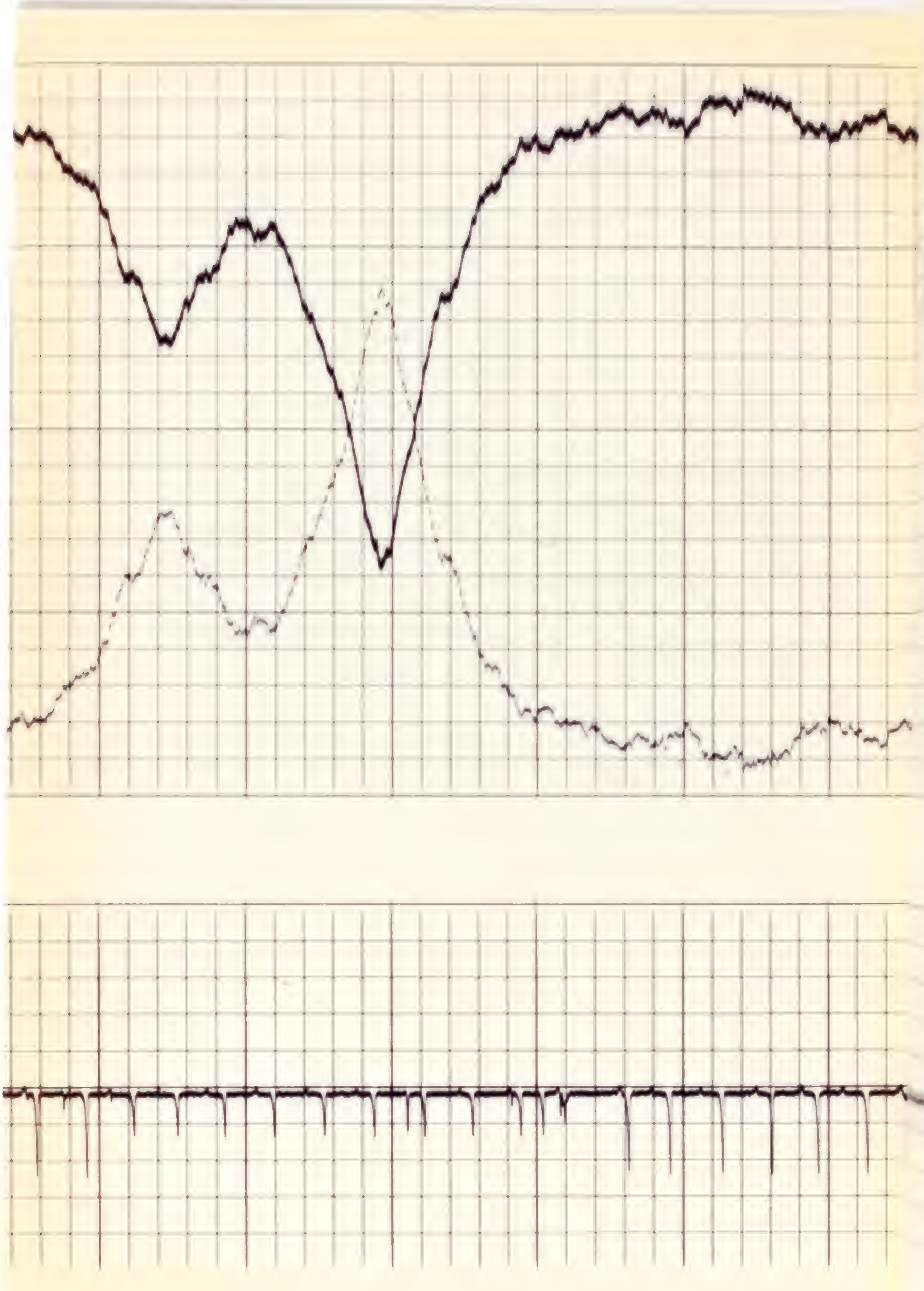
1200

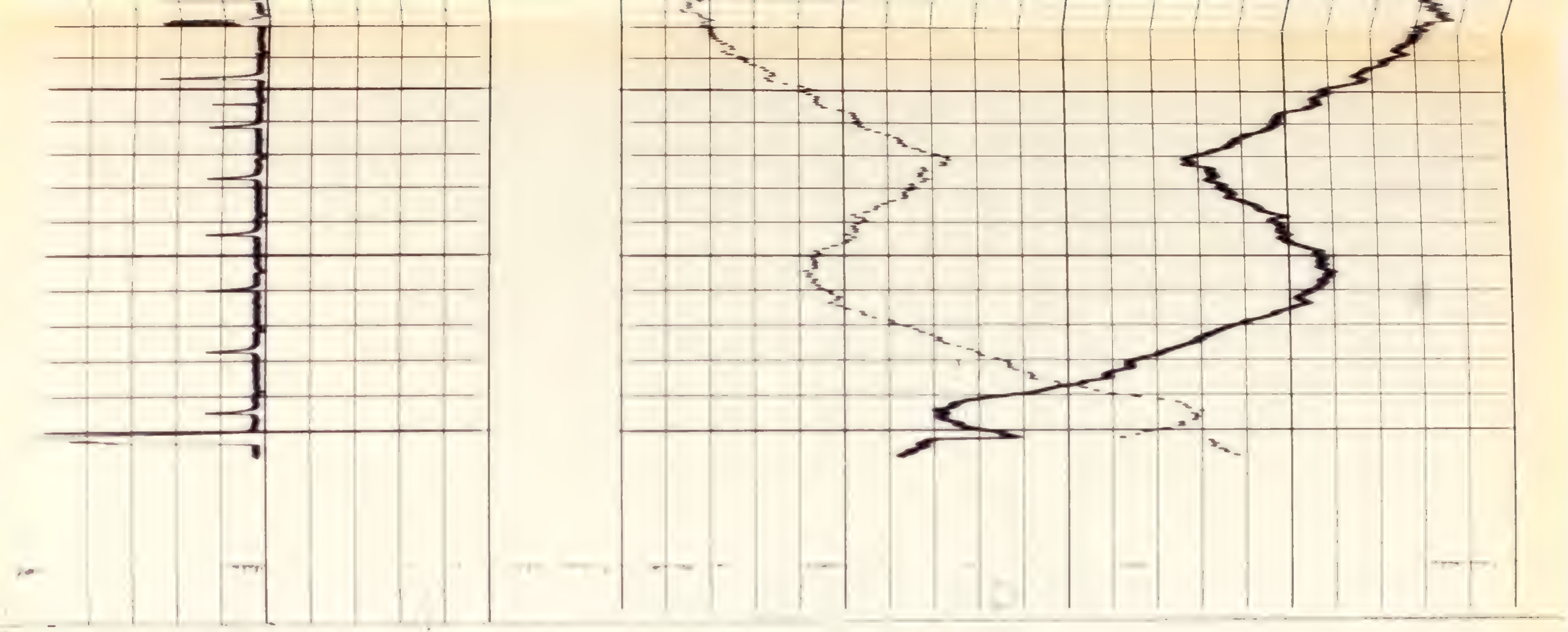



1300
F.R.



NO.3-SHORT STRING
TYPICAL ORIENTING RECORD
GUN #1 PERFORATED 1959-1149

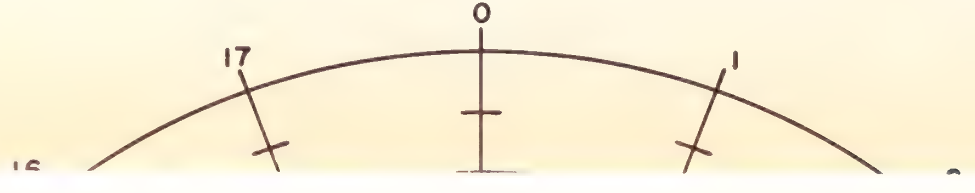


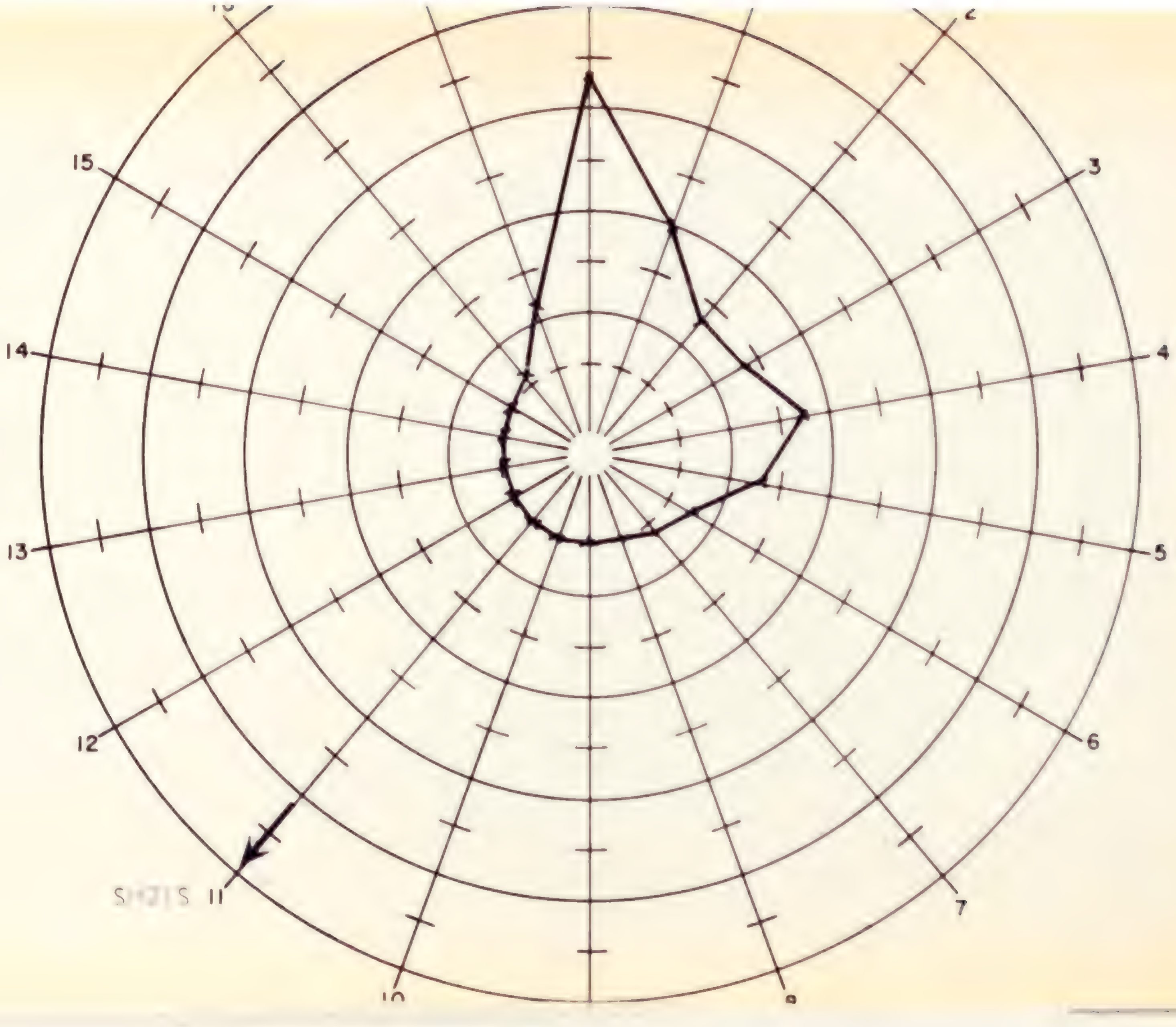


RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1330 1340 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET

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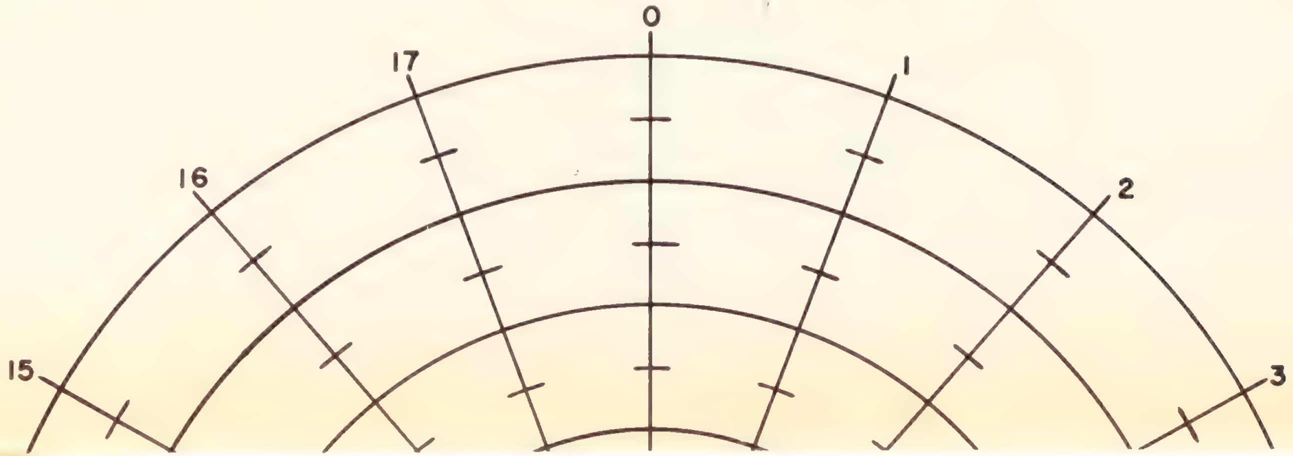
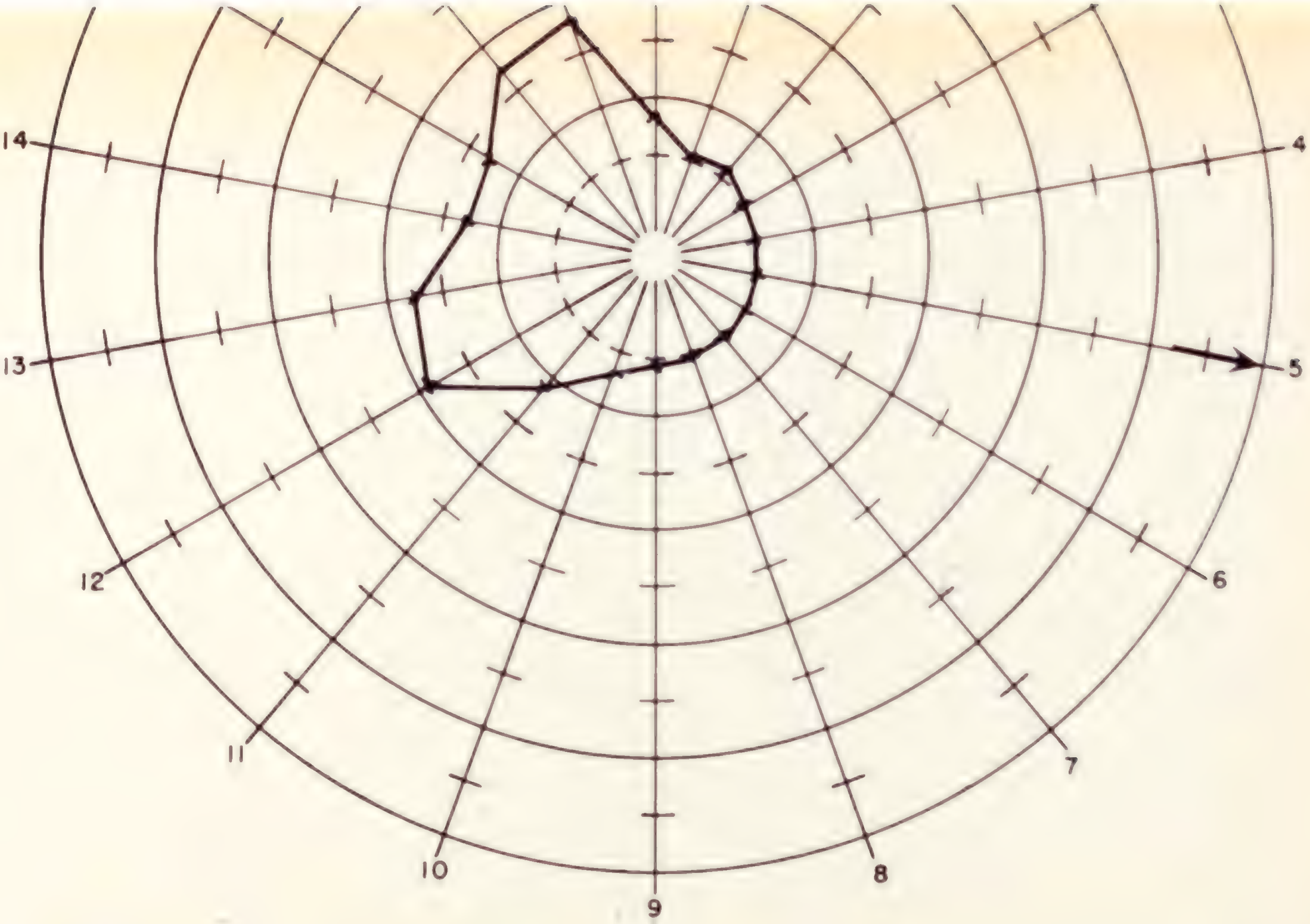
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

RADIORIENTATION PLOT

POT-B

NO.3 SHORT STRING PERFORATED 1319-1329 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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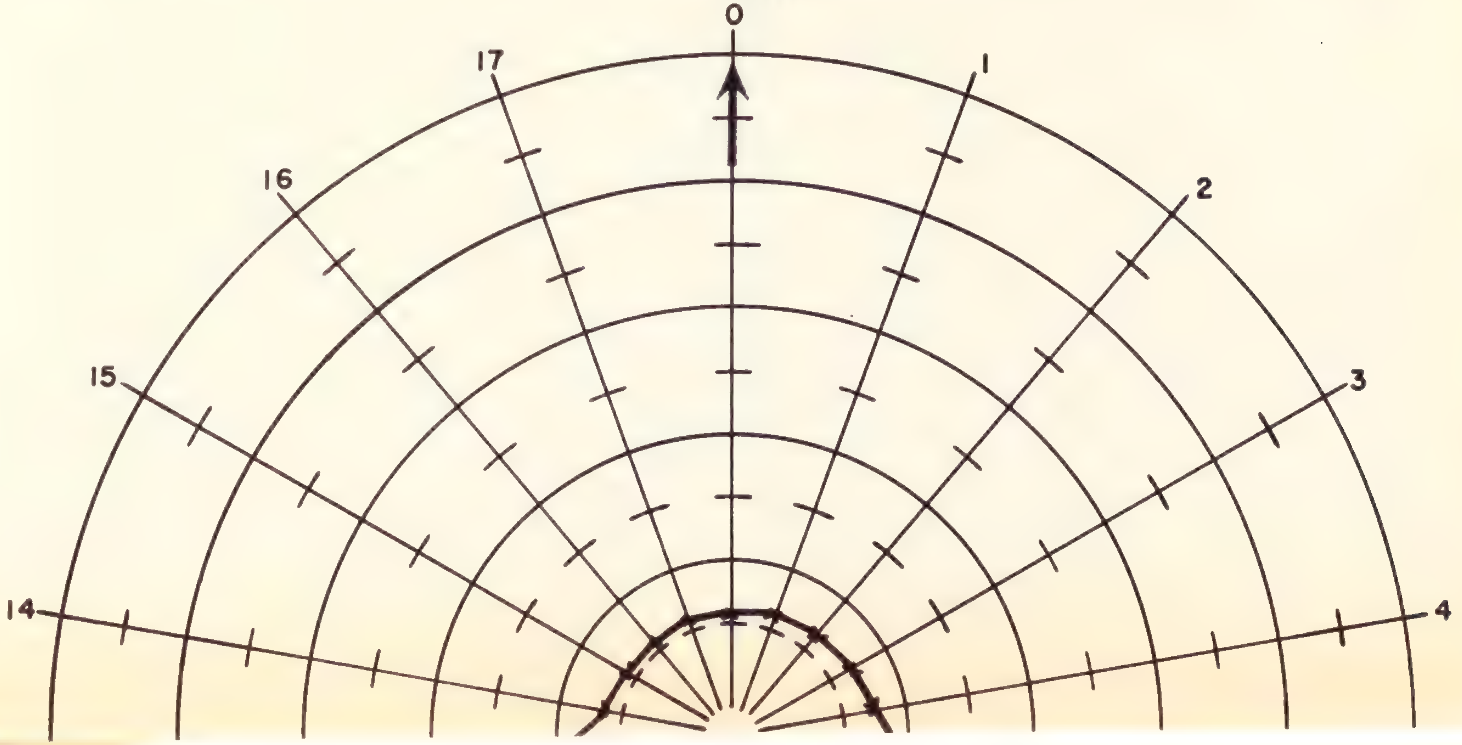
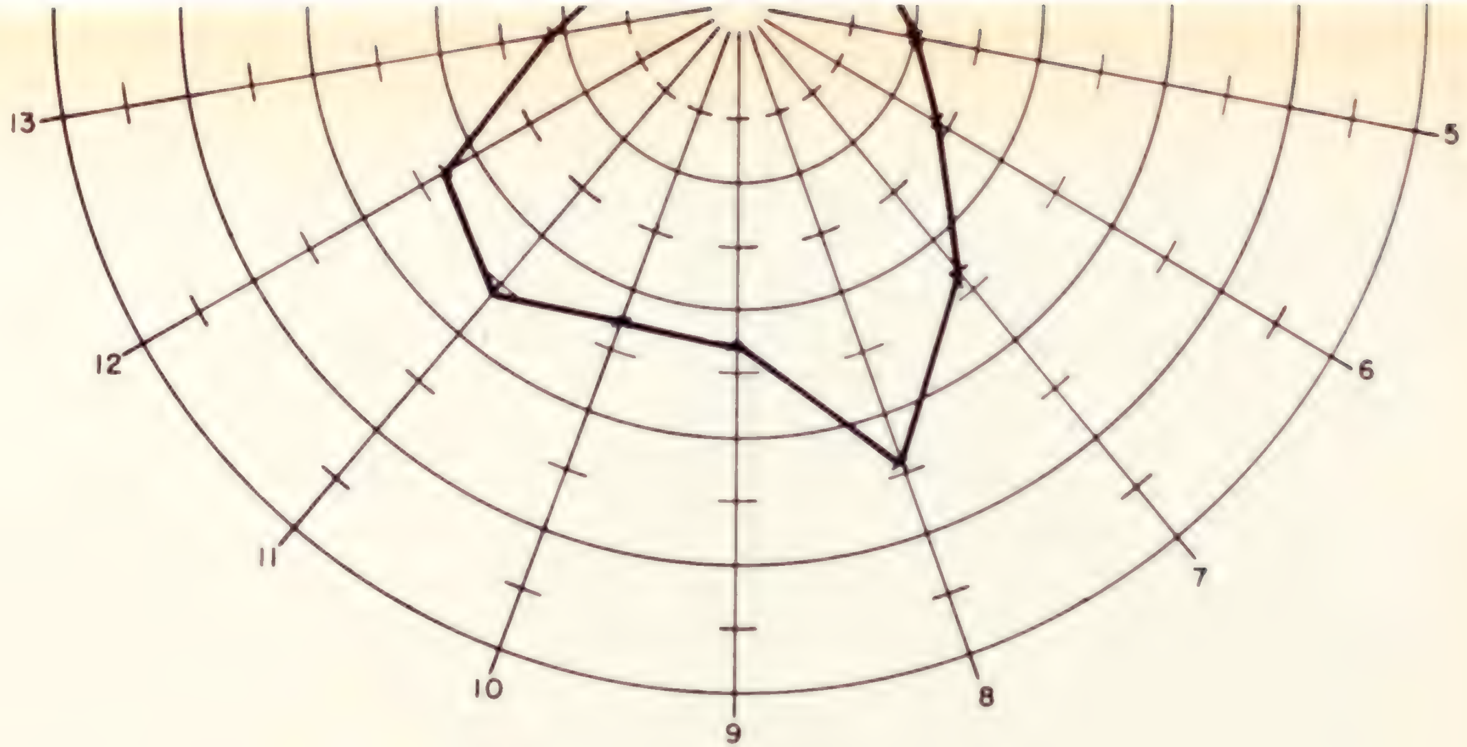
RADIORIENTATION PLOT

POT-B

NO. 3 SHORT STRING PERFORATED 1308-1318 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET
SHOTS





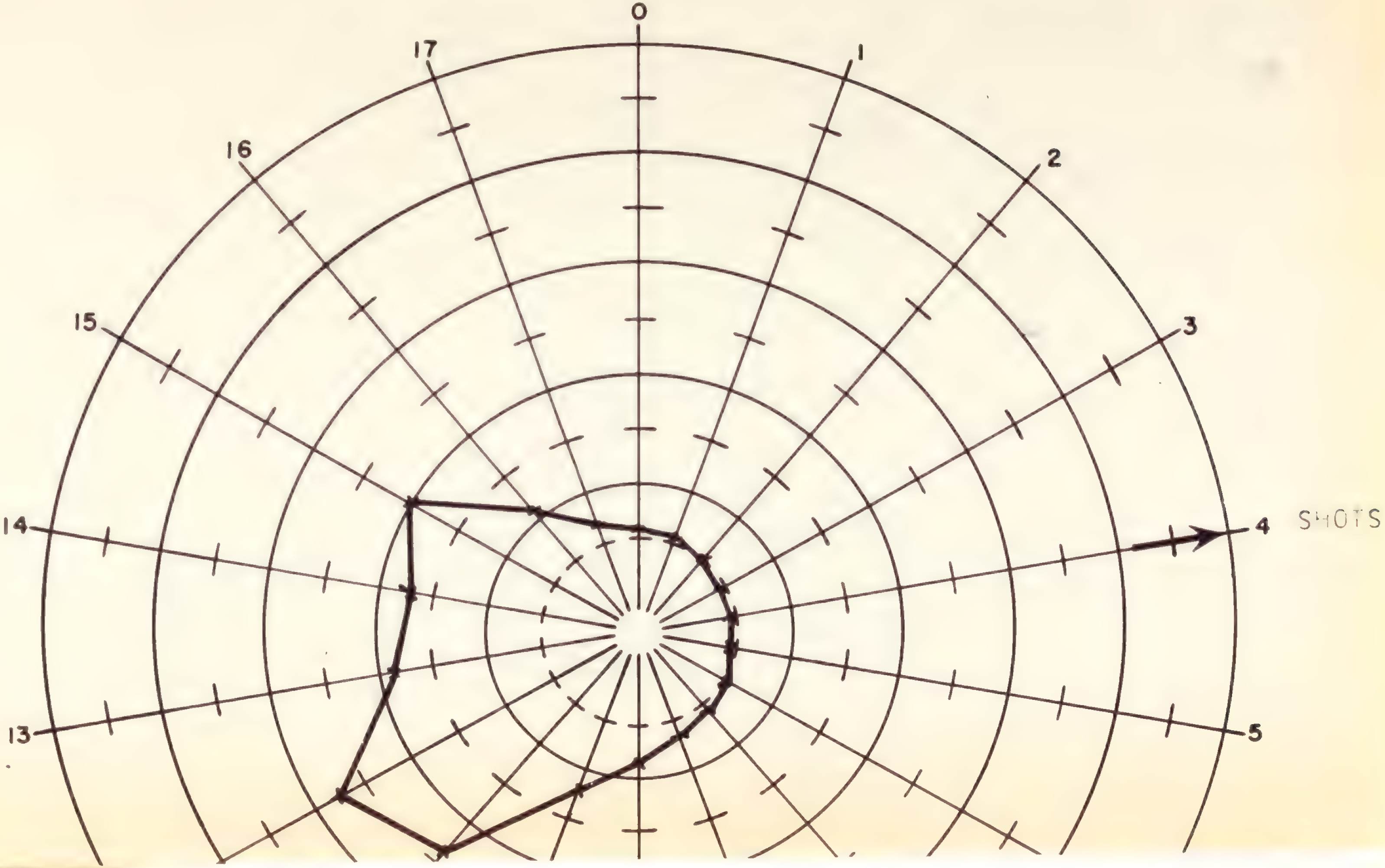
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

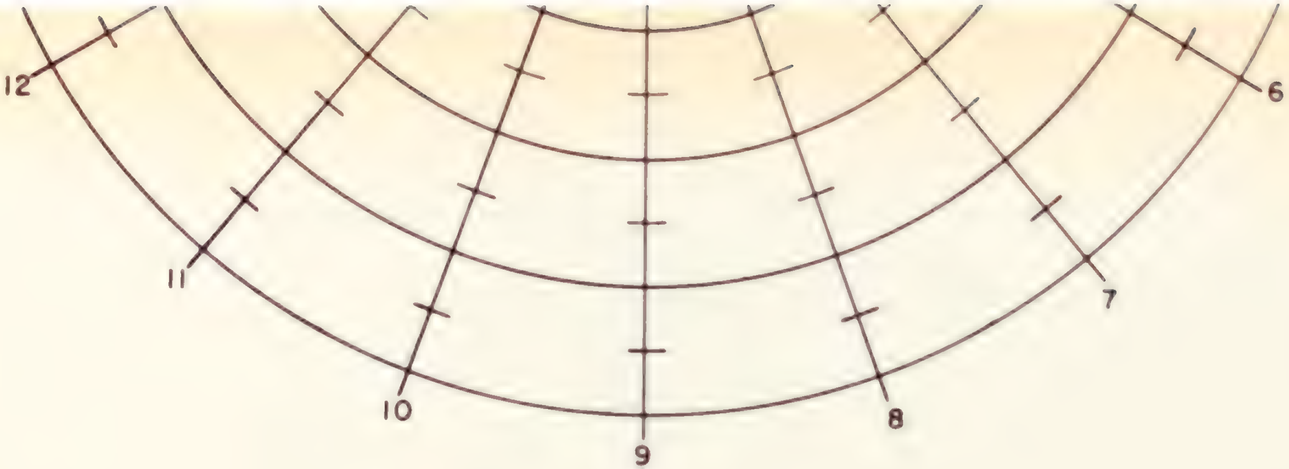
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 3 SHORT STRING PERFORATED 1297-1307 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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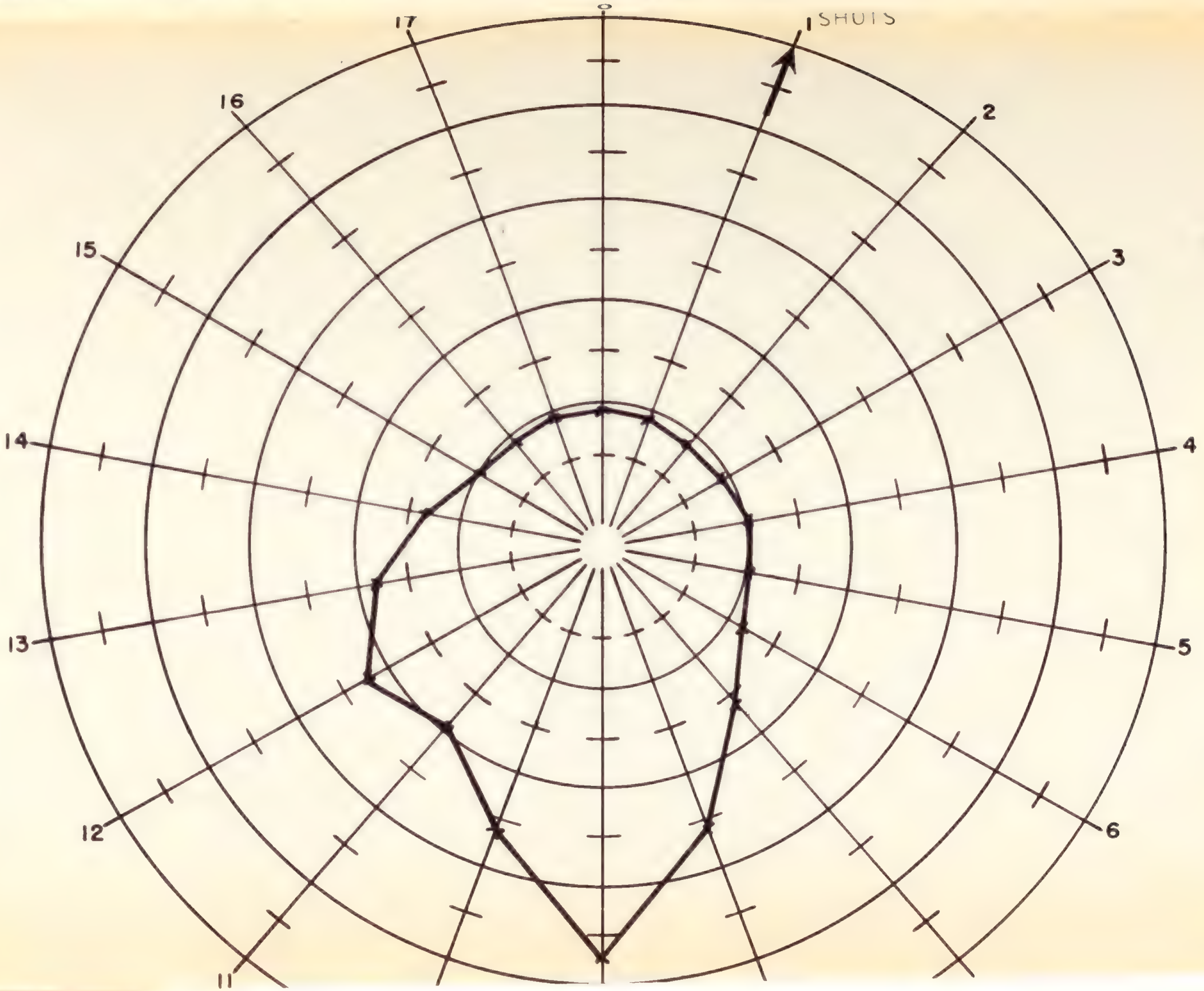
RADIORIENTATION PLOT

POT-B

NO. 3-SHORT STRING PERFORATED 1286-1296 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET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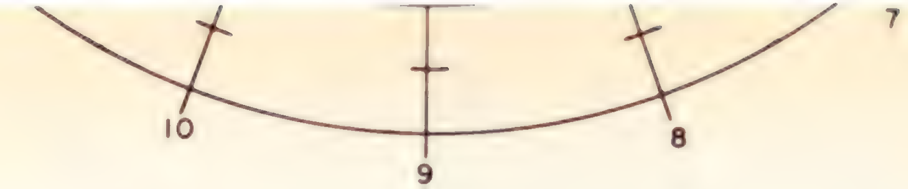

This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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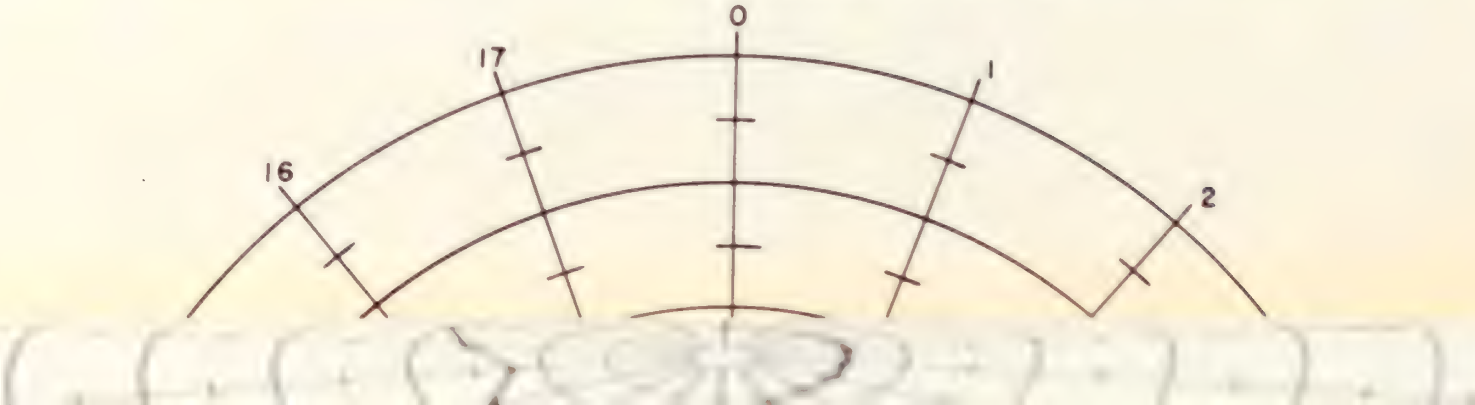
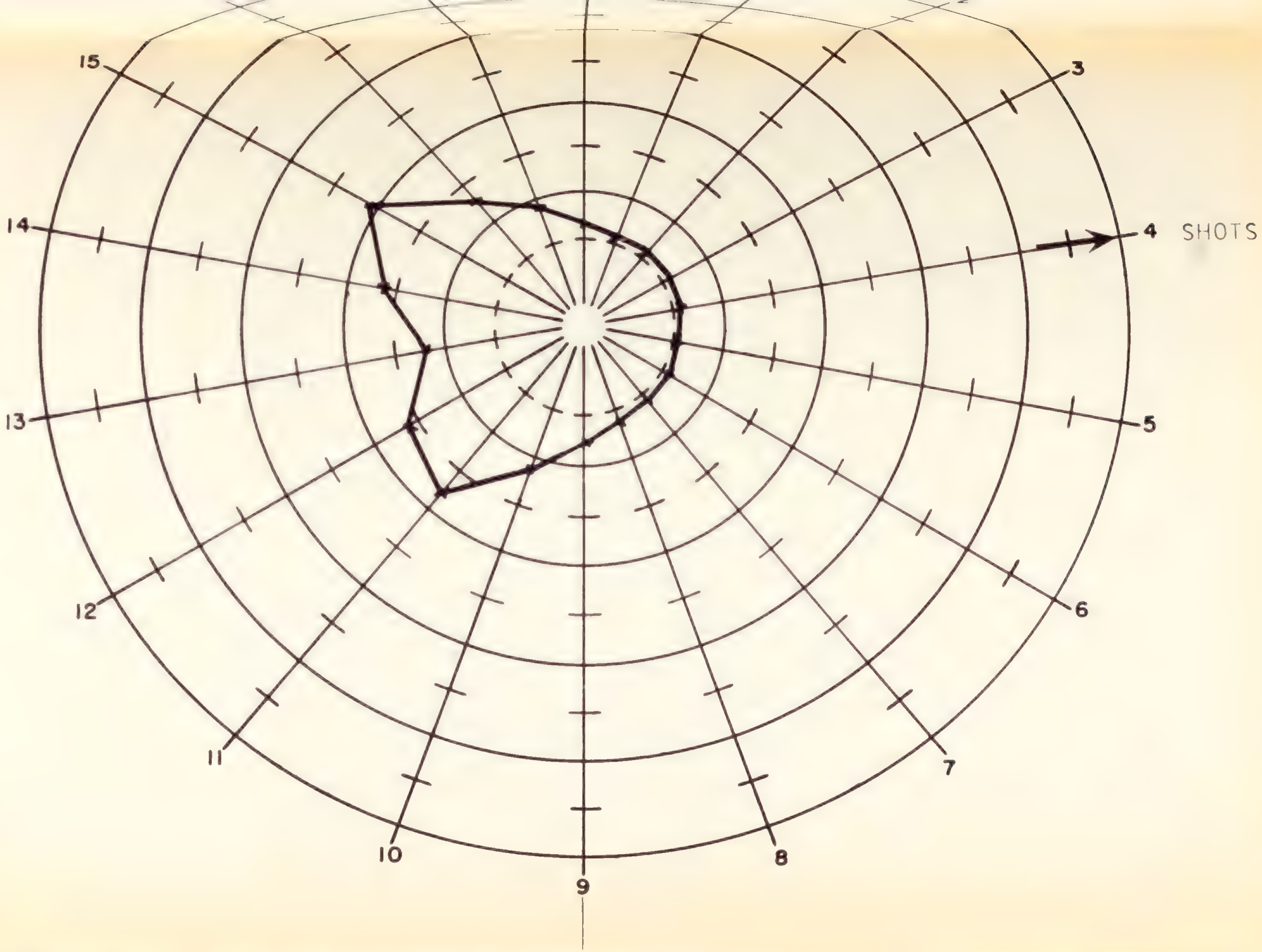
RADIORIENTATION PLOT

POT-B

NO. 3 SHORT STRING PERFORATED 1275-1285 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and de-

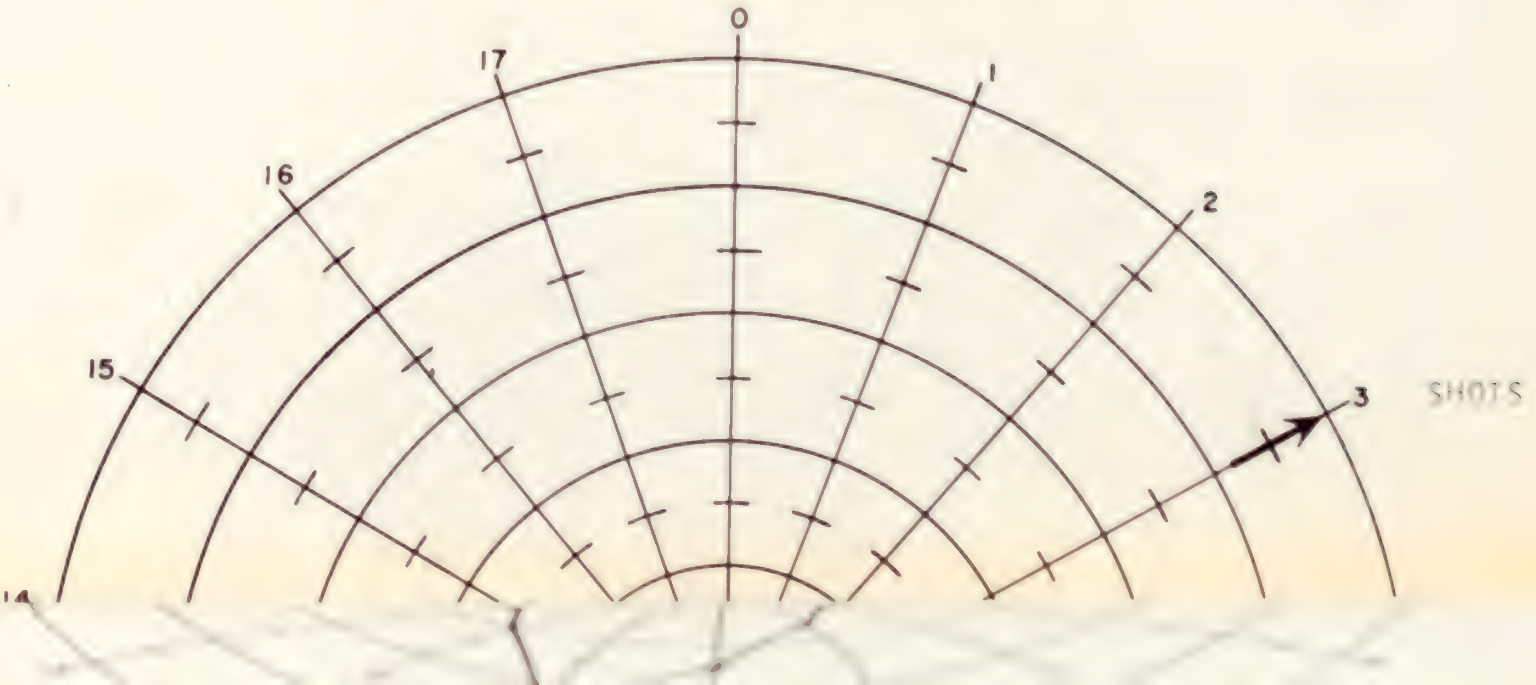
testing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

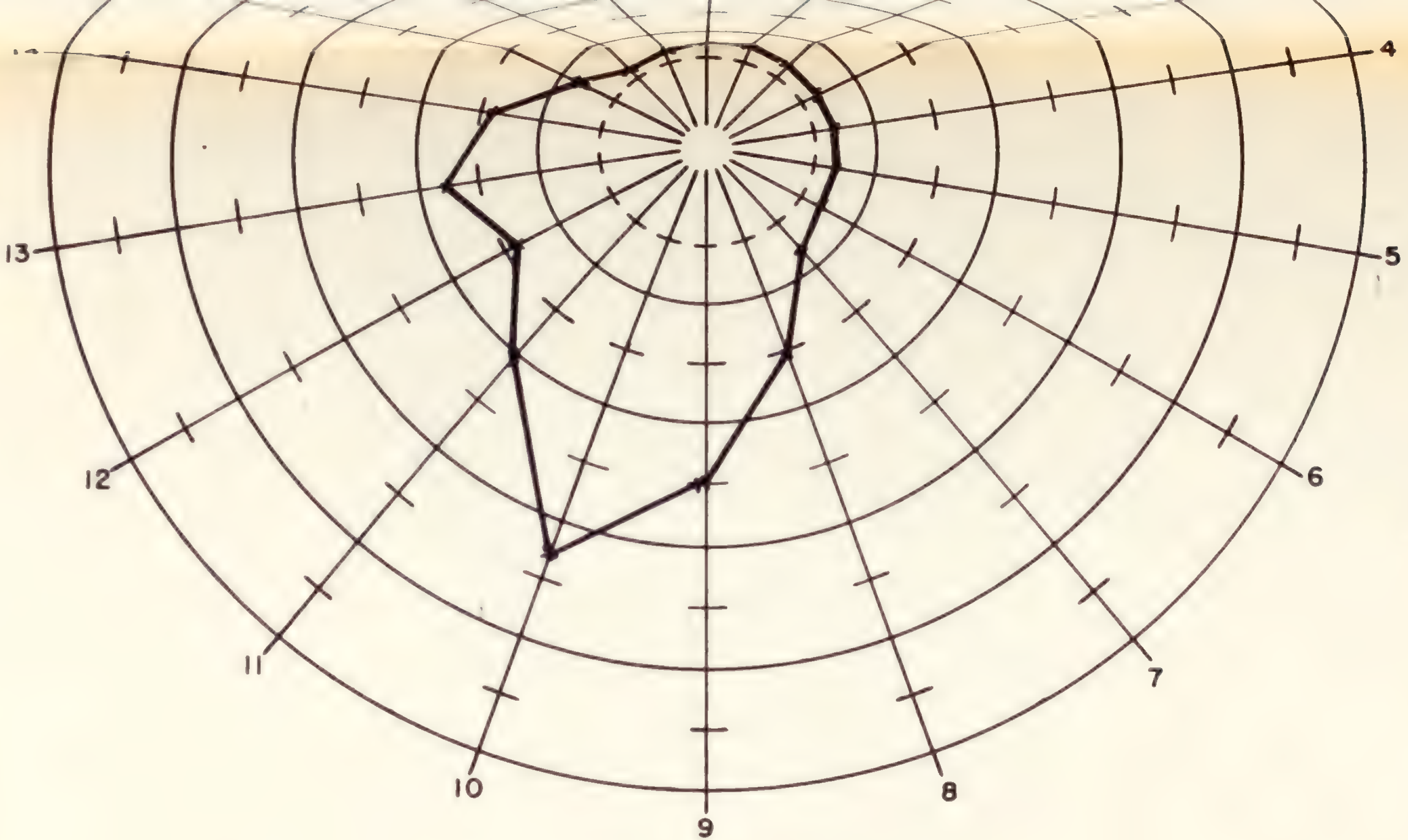
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 3-SHORT STRING PERFORATED 1264-1274 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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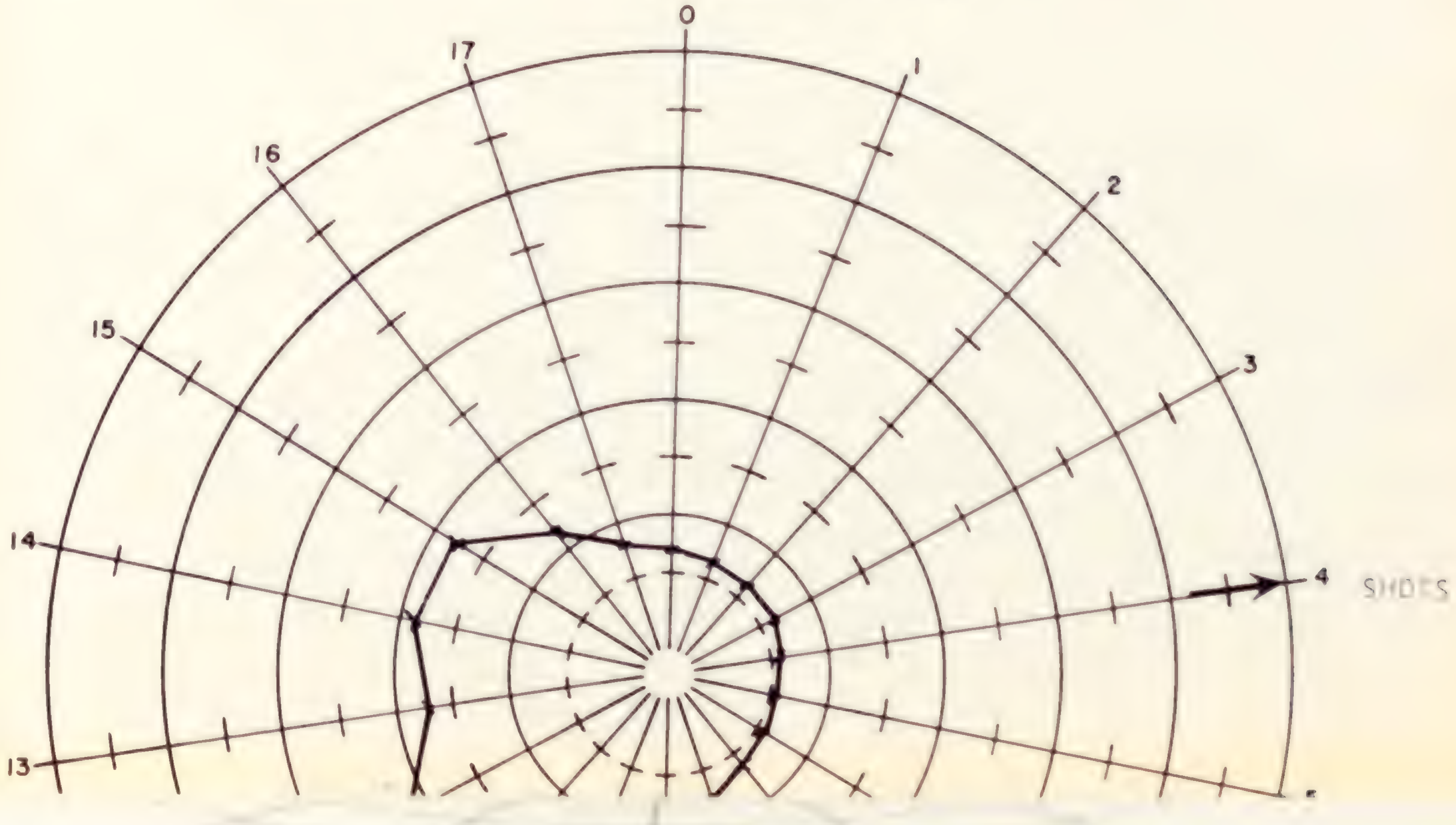
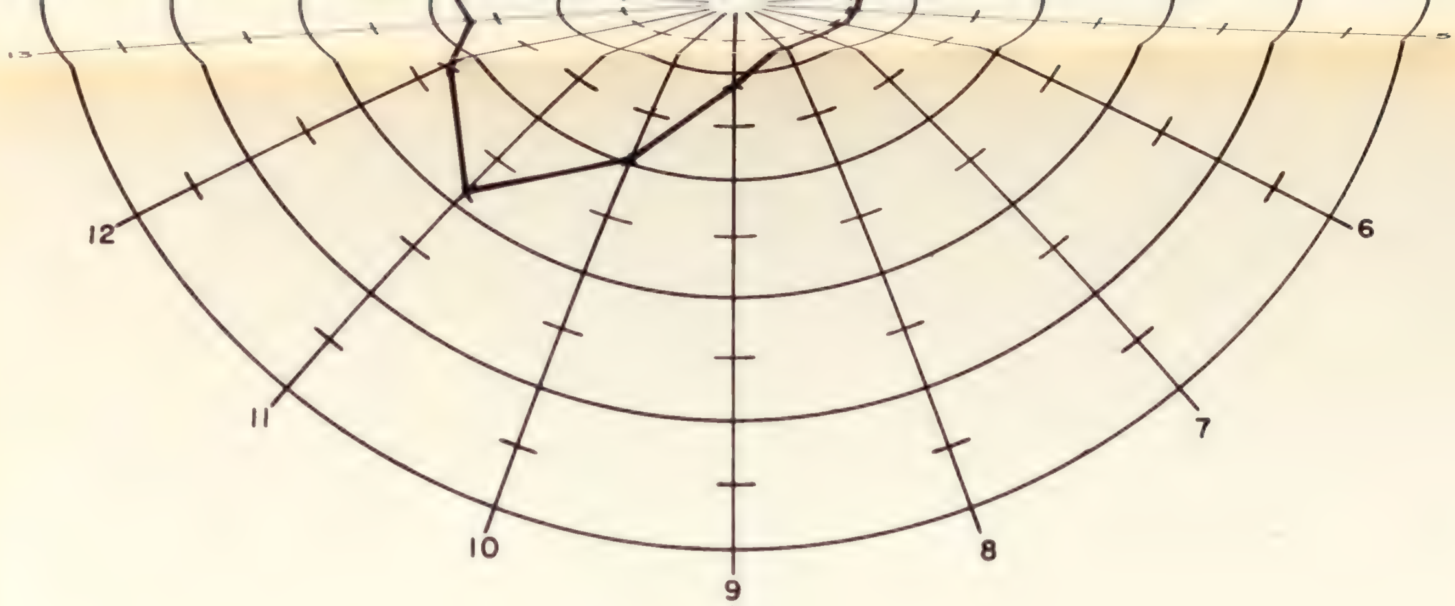
RADIORIENTATION PLOT

POT-B

O. 3-SHORT STRING PERFORATED 1259-1269 ONE SHOT PER FOOT WITH 1 9/16"
SCALLOPED HYPER JET





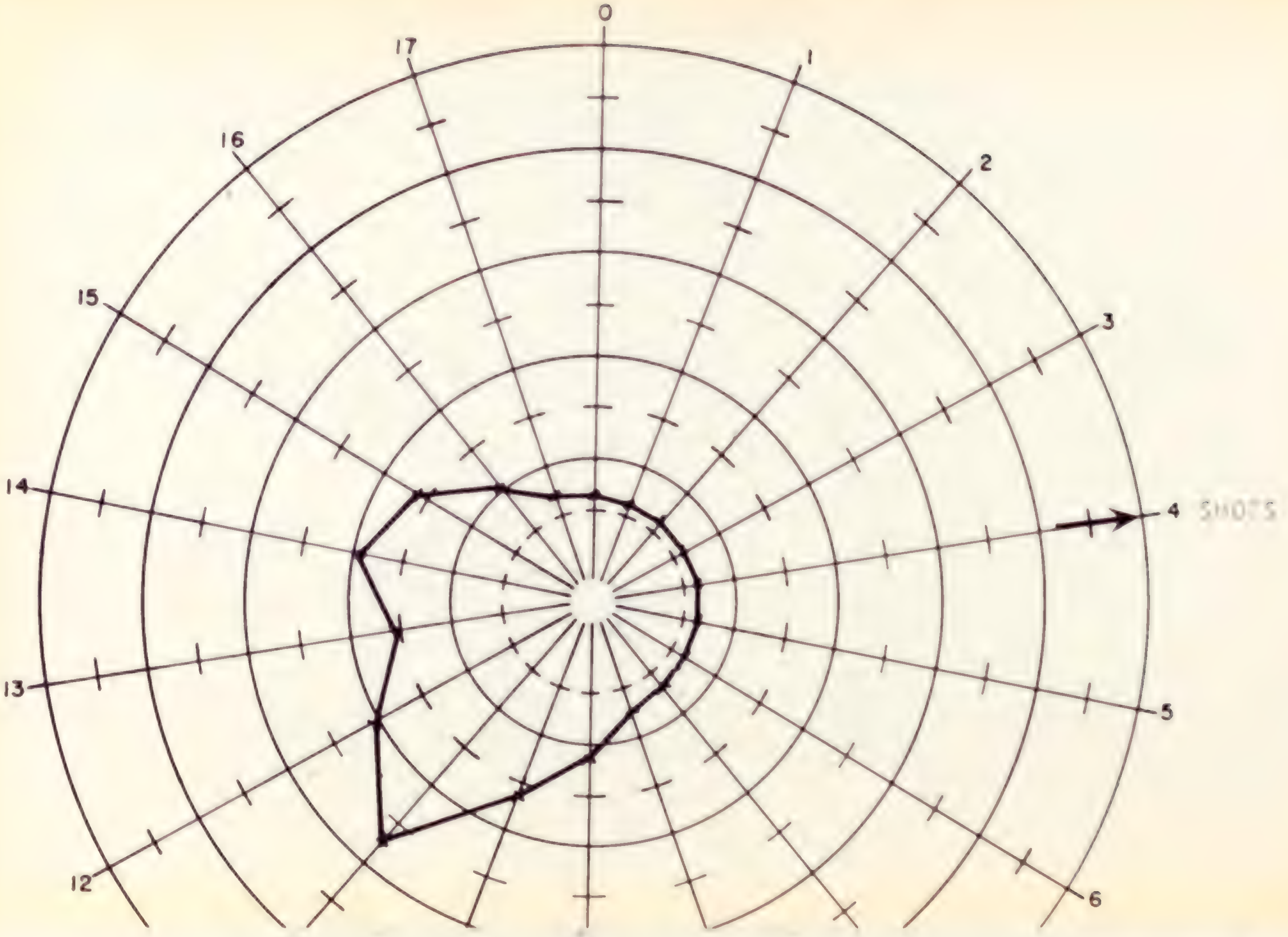
chart, computation and or interpretation of our readings from our gamma gamma orientation and de
ng instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
ire set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
of our Service Order for this job. The readings could be adversely affected by vagrant metal in the
hole and other conditions unknown to us.

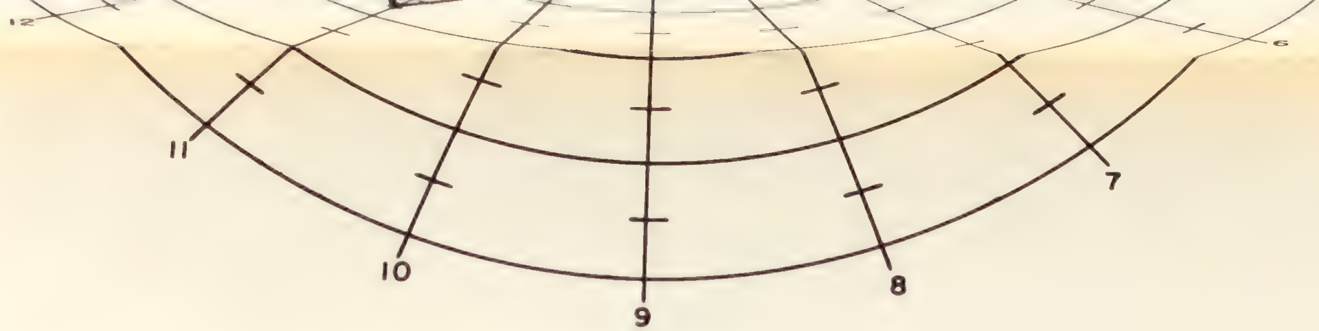
Schlumberger

RADIORIENTATION PLOT

POT-B

SCALLOPED MIXER JET





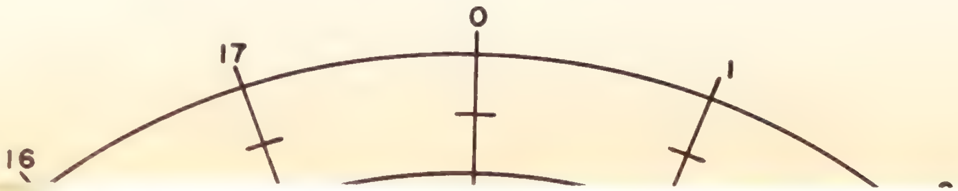
art, computation and or interpretation of our readings from our gamma gamma orientation and de
instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
our Service Order for this job. The readings could be adversely affected by vagrant metal in the
le and other conditions unknown to us

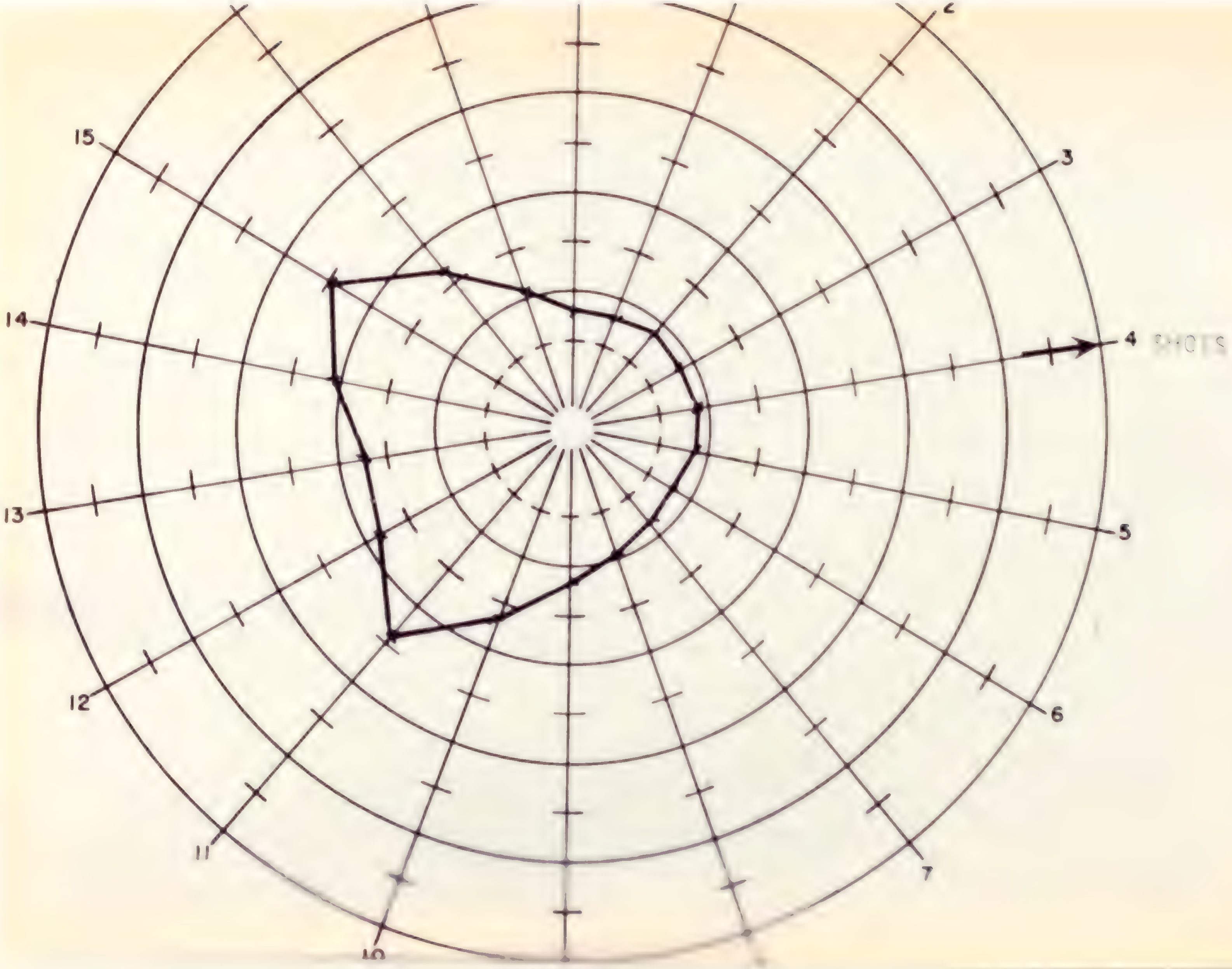
Schlumberger

RADIORIENTATION PLOT

POT-B

.3-SHORT STRING PERFORATED 1242-1248 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

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SHOTS
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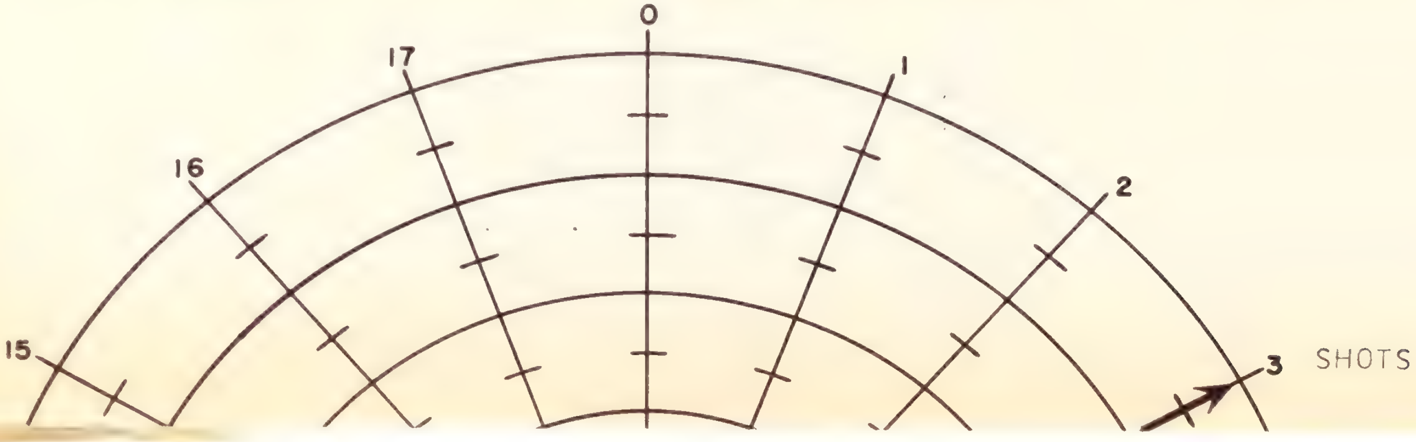
computation and/or interpretation is an opinion based on [illegible] rument is presented to you in accordance with and subject to the General Terms and Conditions out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse Service Order for this job. The readings could be adversely affected by vagrant metal in the nd other conditions unknown to us.

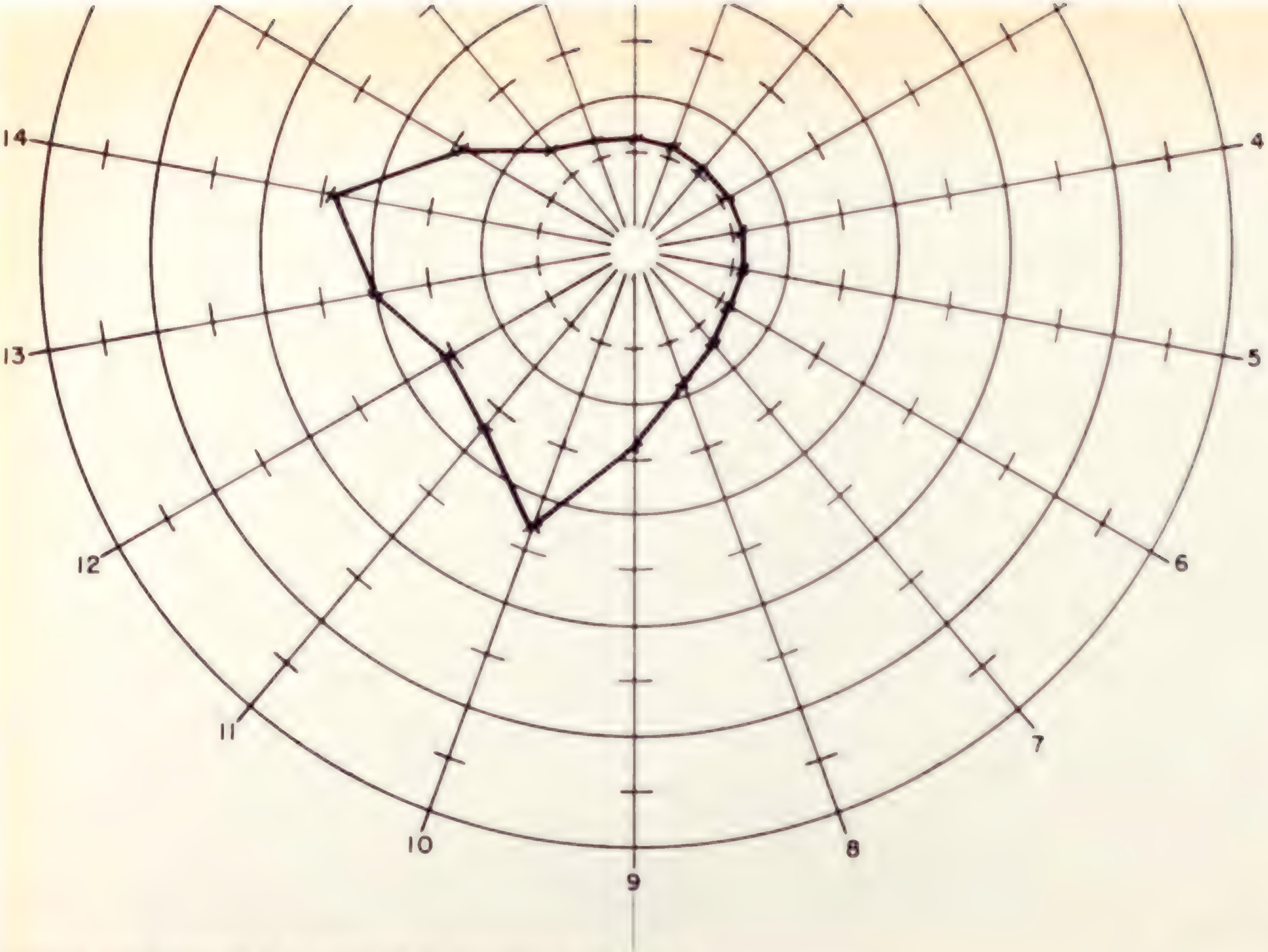
Schlumberger

RADIORIENTATION PLOT

POT-B

SHORT STRING PERFORATED 1238-1248 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





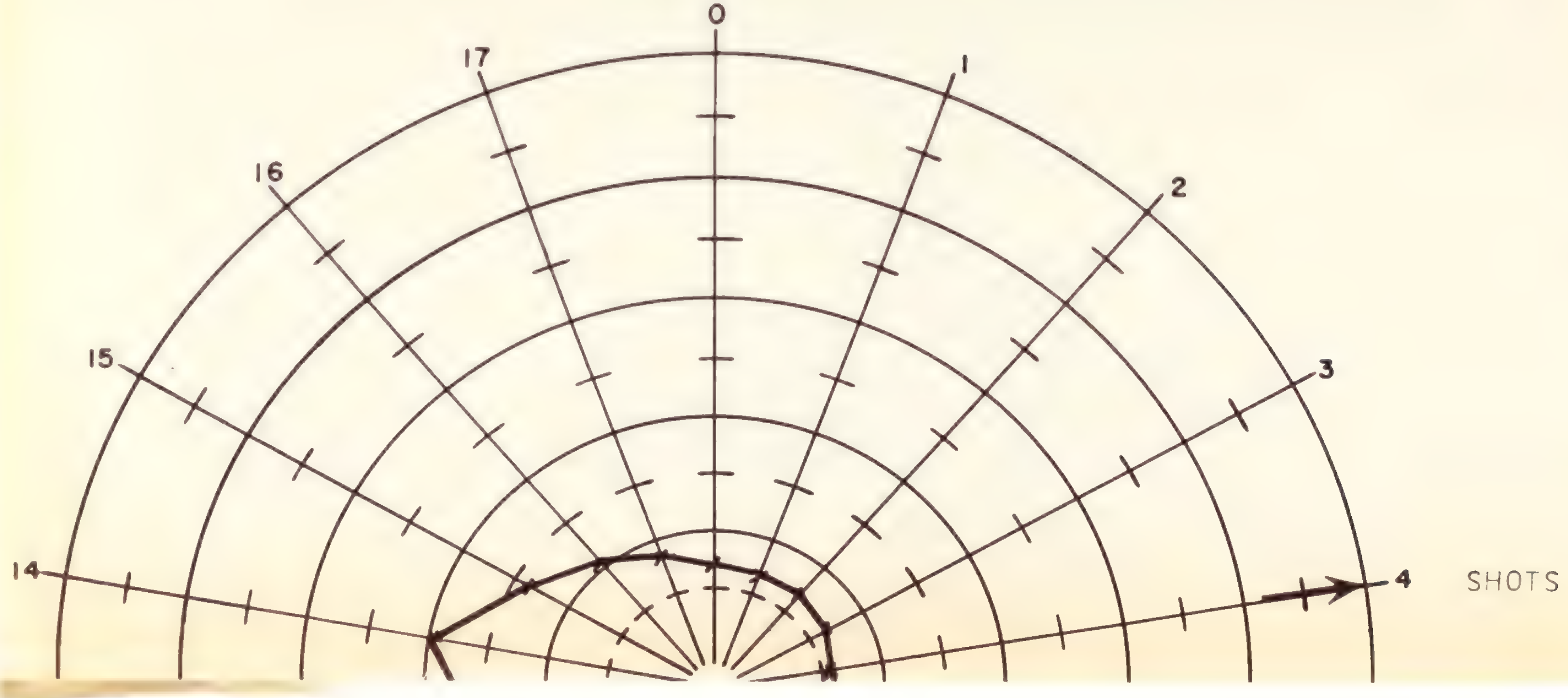
computation and/or interpretation of our readings from our gamma-gamma orientation and do-
cument is presented to you in accordance with, but subject to, the General Terms and Conditions
[illegible] of our current Price Schedule and which are to set out on the reverse
Service Order [illegible]. The readings could be adversely affected by magnetic metal in the
and other conditions unknown to us.

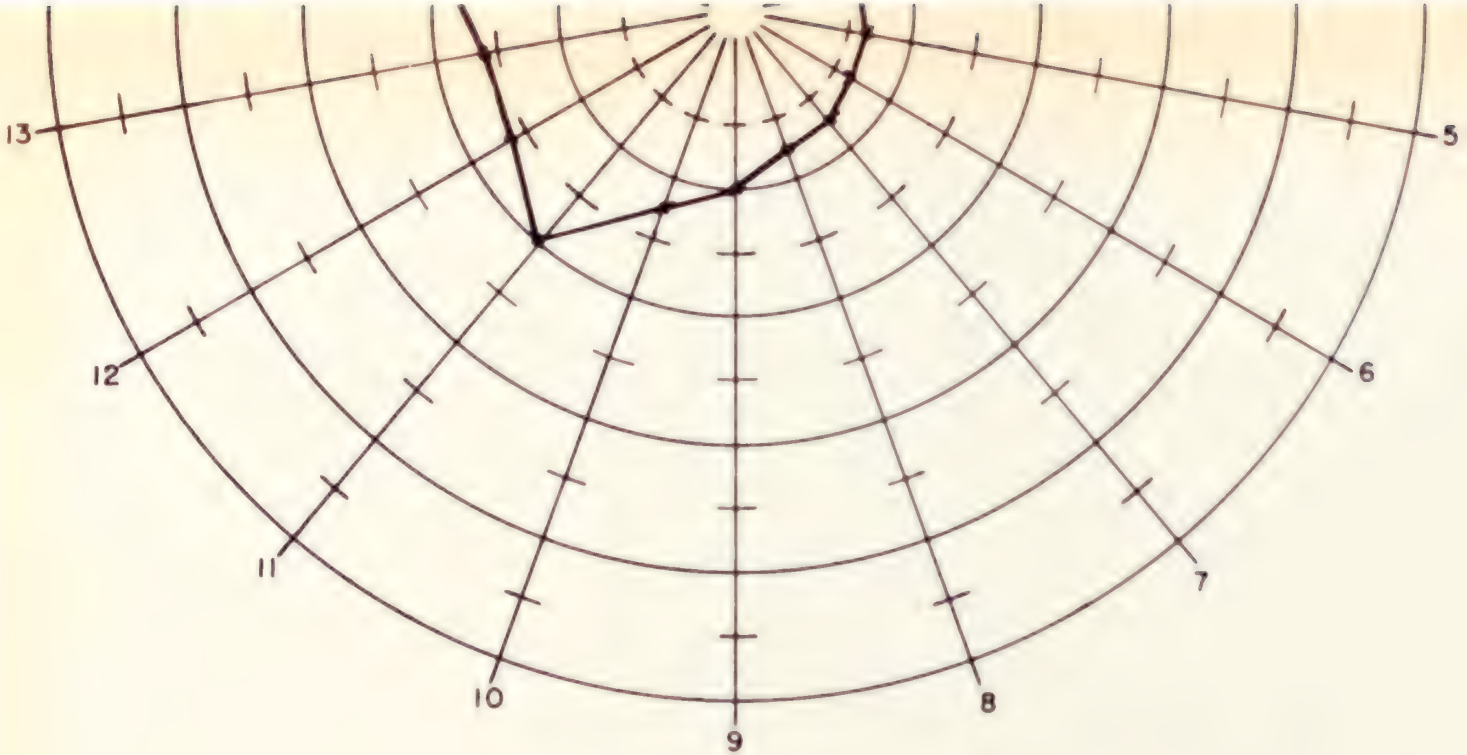
Schlumberger

RADIORIENTATION PLOT

POT-B

SHORT STRING PERFORATED 1227-1237 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





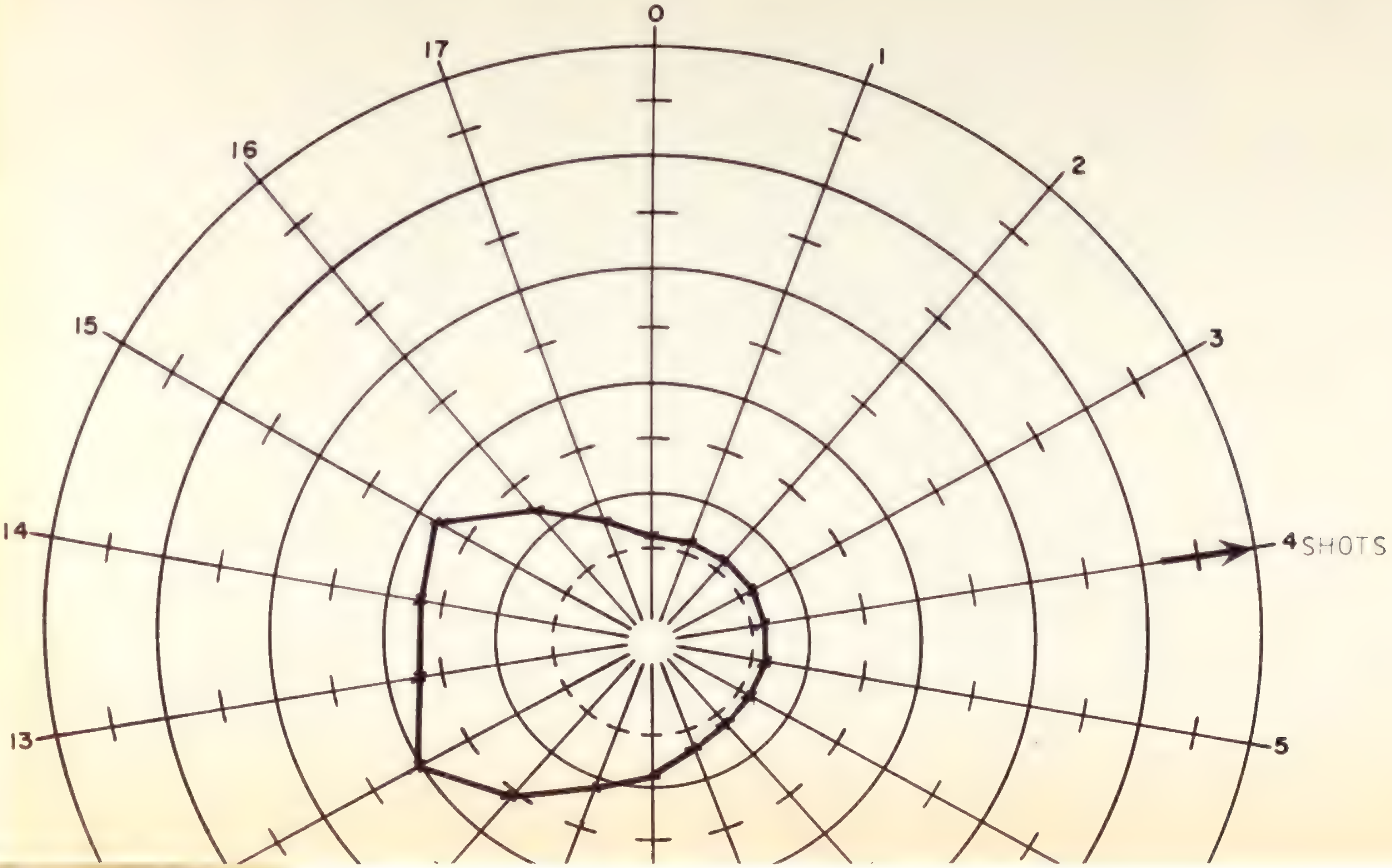
computation and or interpretation of our readings from our gamma-gamma orientation [illegible] to
trument is presented to you in accordance with, but subject to, the General Terms and Conditions
out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
Service Order for this job. The readings could be adversely affected by magnetic metal in the
and other conditions unknown to us.

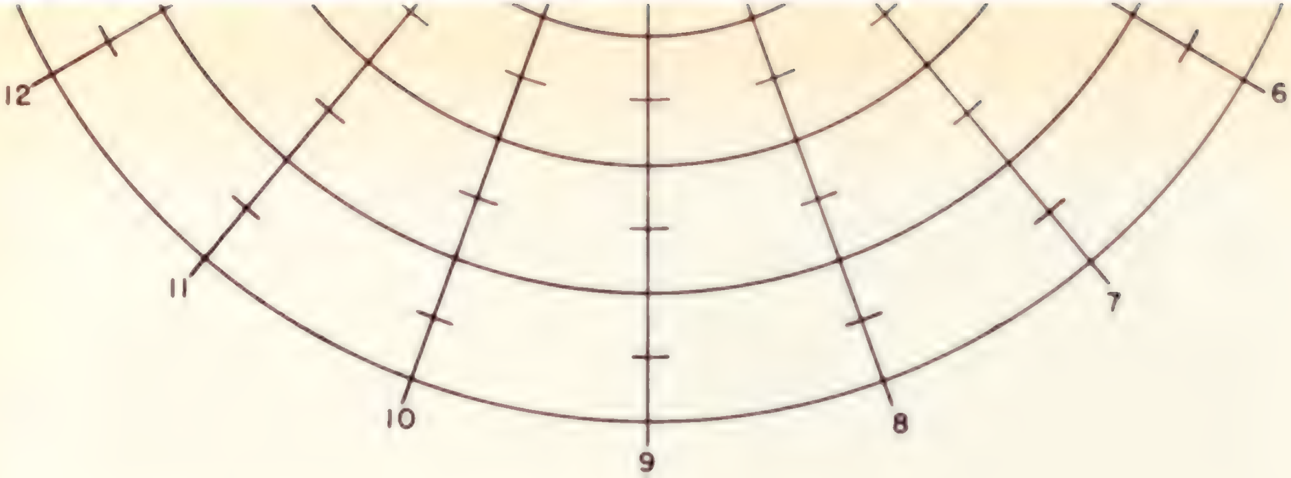
Schlumberger

RADIORIENTATION PLOT

POT-B

SHORT STRING PERFORATED 1216-1226 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





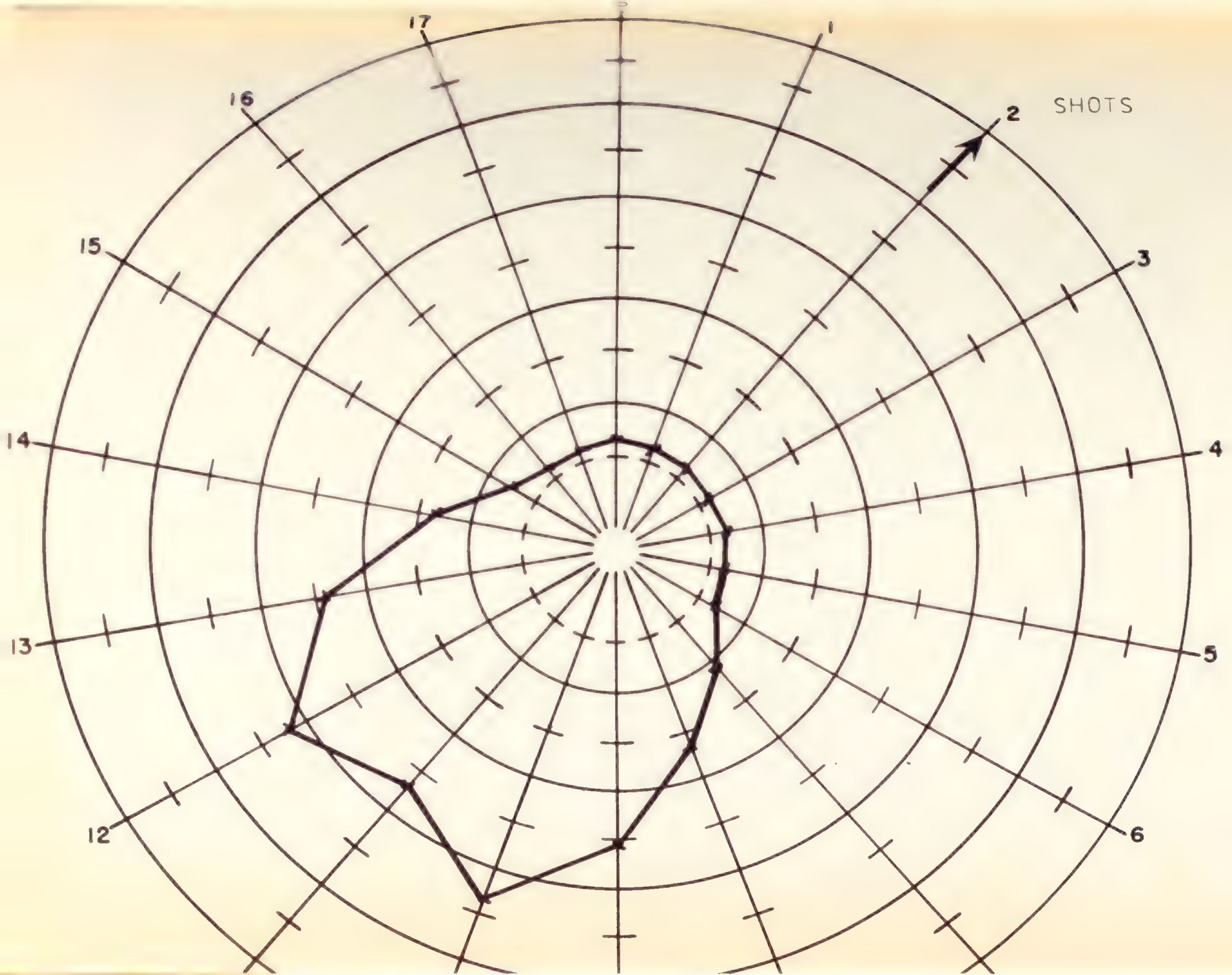
computation and or interpretation of our readings from our gamma-gamma orientation and de
rument is presented to you in accordance with, but subject to, the General Terms and Conditions
out on pages 1 and 2 of our current Price Schedule and which are as set out in the reverse
Service Order for this job. The readings could be adversely affected by adjacent metal in the
nd other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B

[illegible] 1200 [illegible] PER FOOT WITH [illegible] HYPERDOME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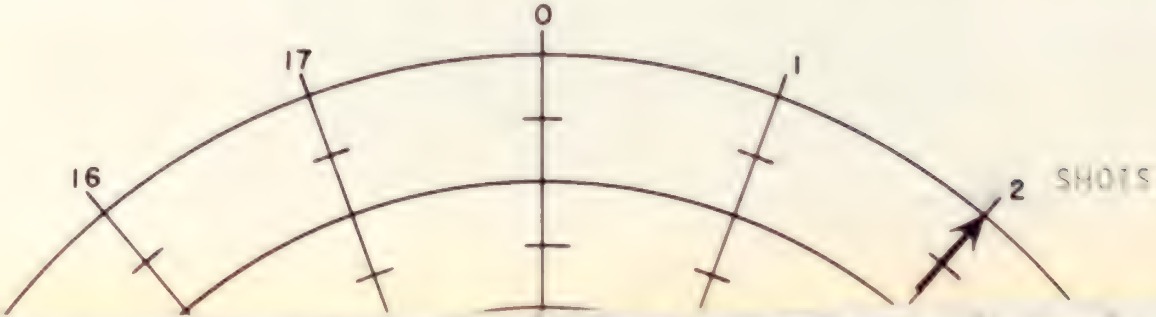
computation and or interpretation of our readings from our gamma-gamma orientation and de
trument is presented to you in accordance with, but subject to, the General Terms and Conditions
out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
Service Order for this job. The readings could be adversely affected by magnetic metal in the
and other conditions unknown to us

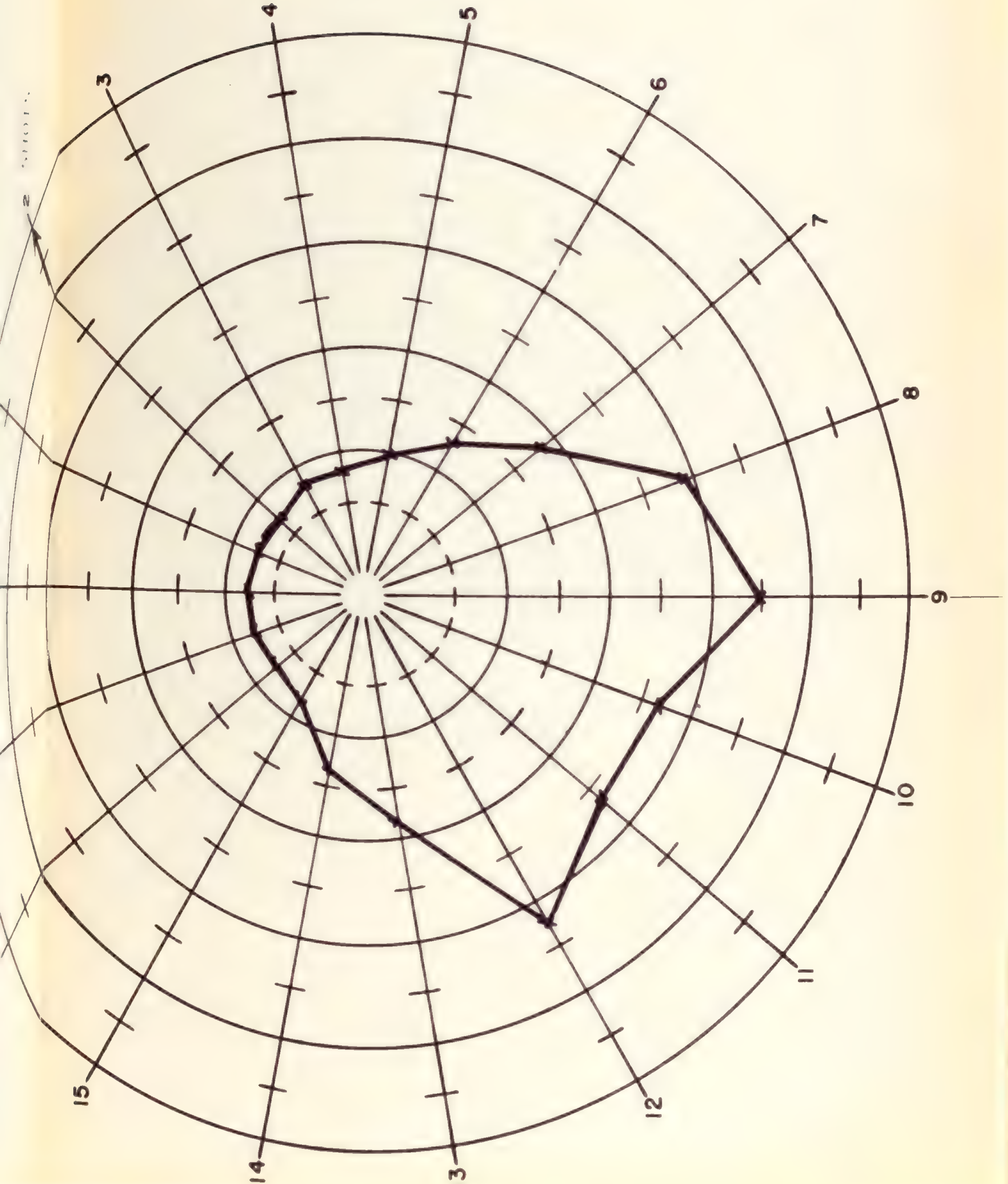
Schlumberger

RADIORIENTATION PLOT

POT-B

-SHORT STRING PERFORATED 1194-1204 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

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nt, computation and/or interpretation of our readings from our gamma-gamma orientation and de
nstrument is presented to you in accordance with, but subject to, the General Terms and Conditions
set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
our Service Order for this job. The readings could be adversely affected by [illegible] metal in the
e and other conditions unknown to us.

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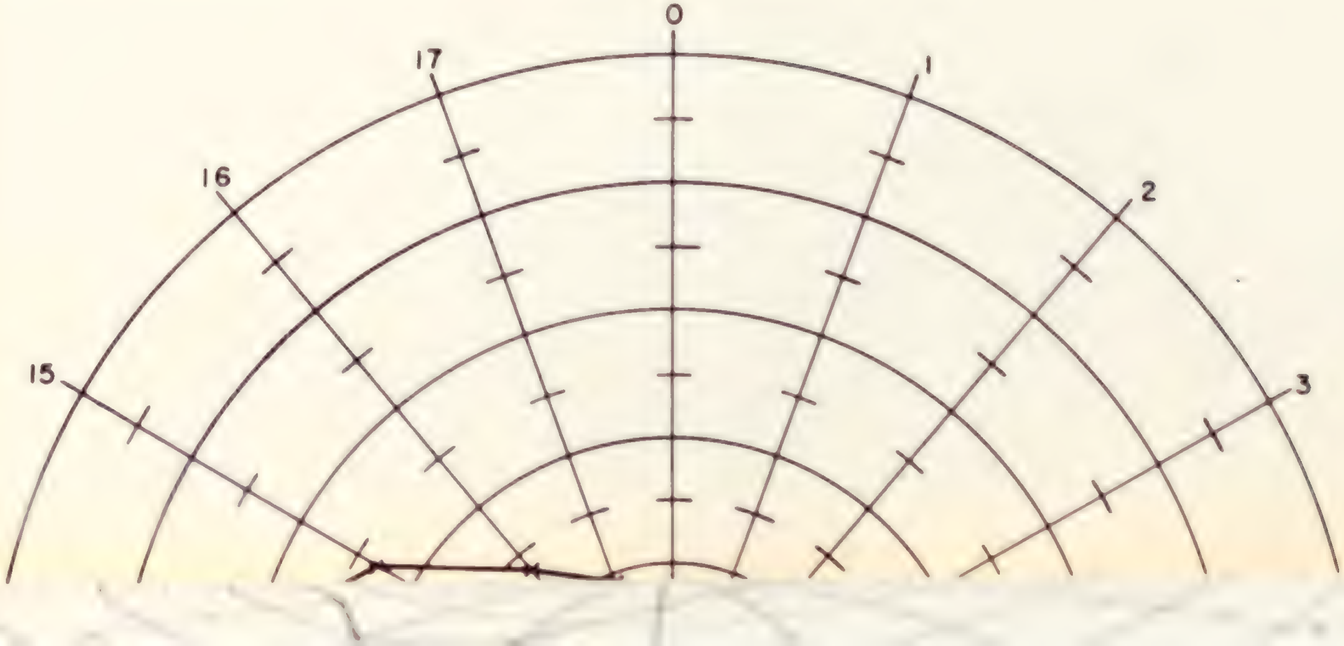
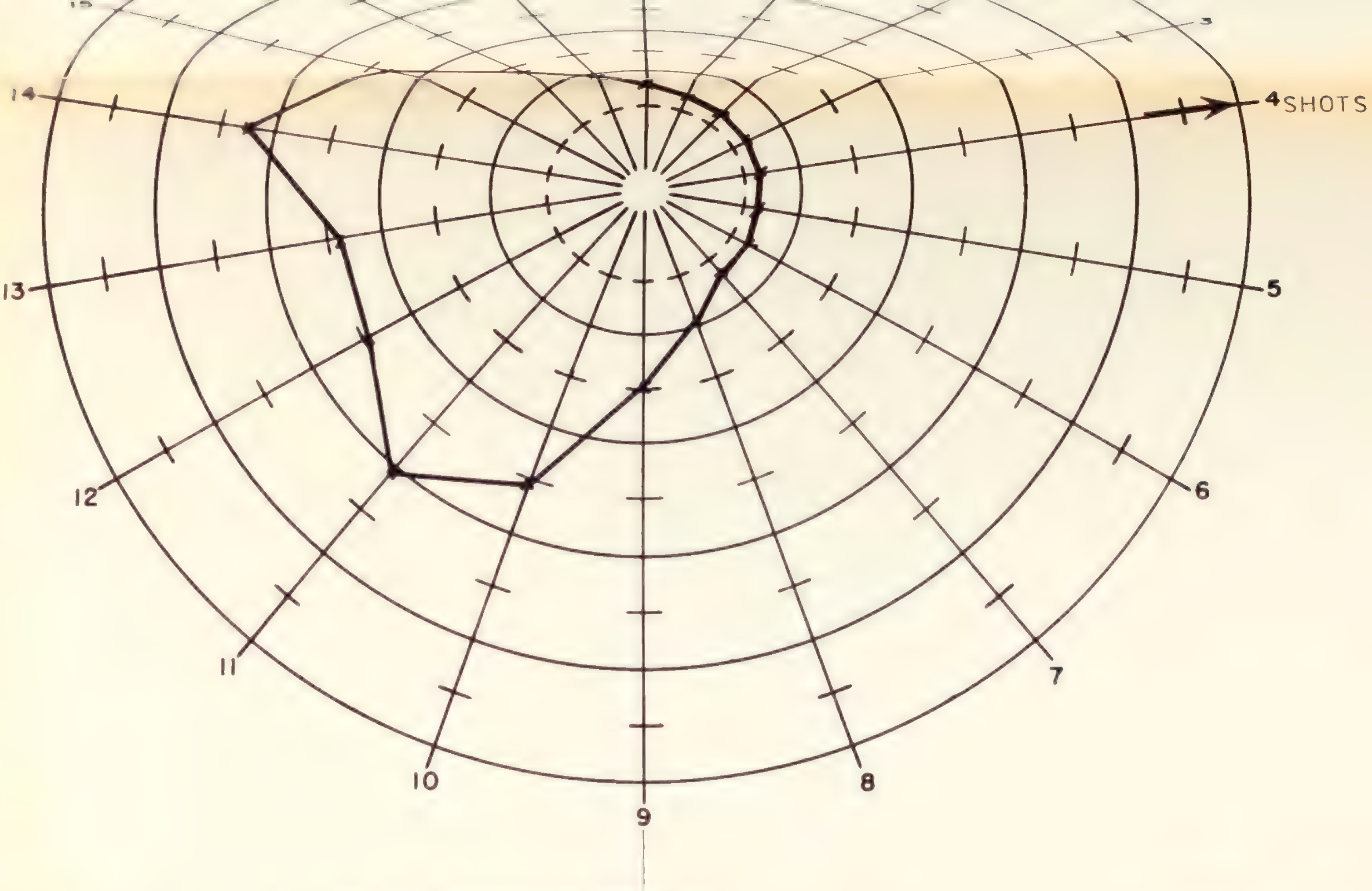
RADIORIENTATION PLOT

POT-B

3 SHORT STRING PERFORATED 1183-1193 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





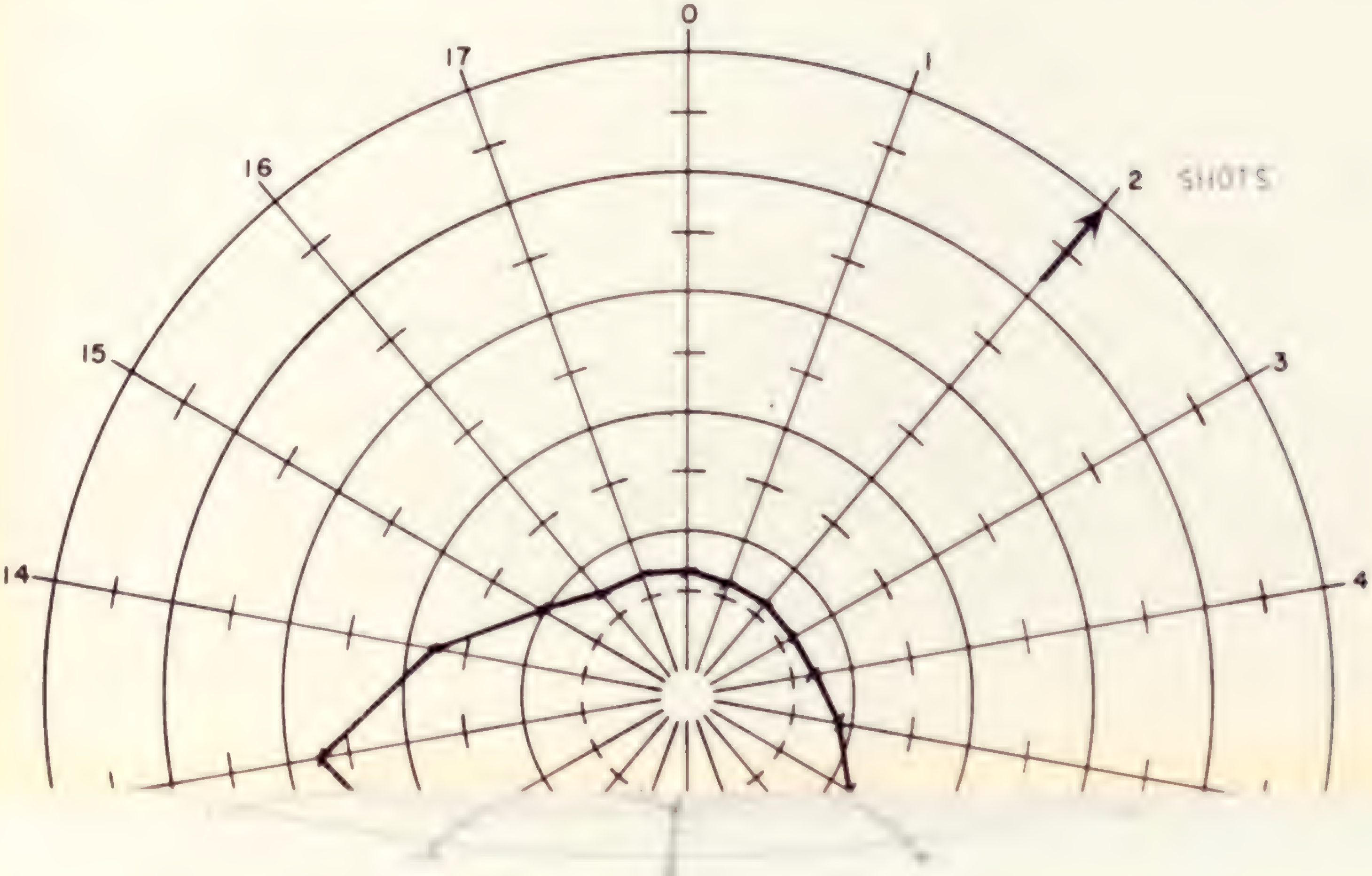
art, computation and/or interpretation of our readings from our gamma-gamma orientation and de
instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
our Service Order for this job. The readings could be adversely affected by vagrant metal in the
e and other conditions unknown to us

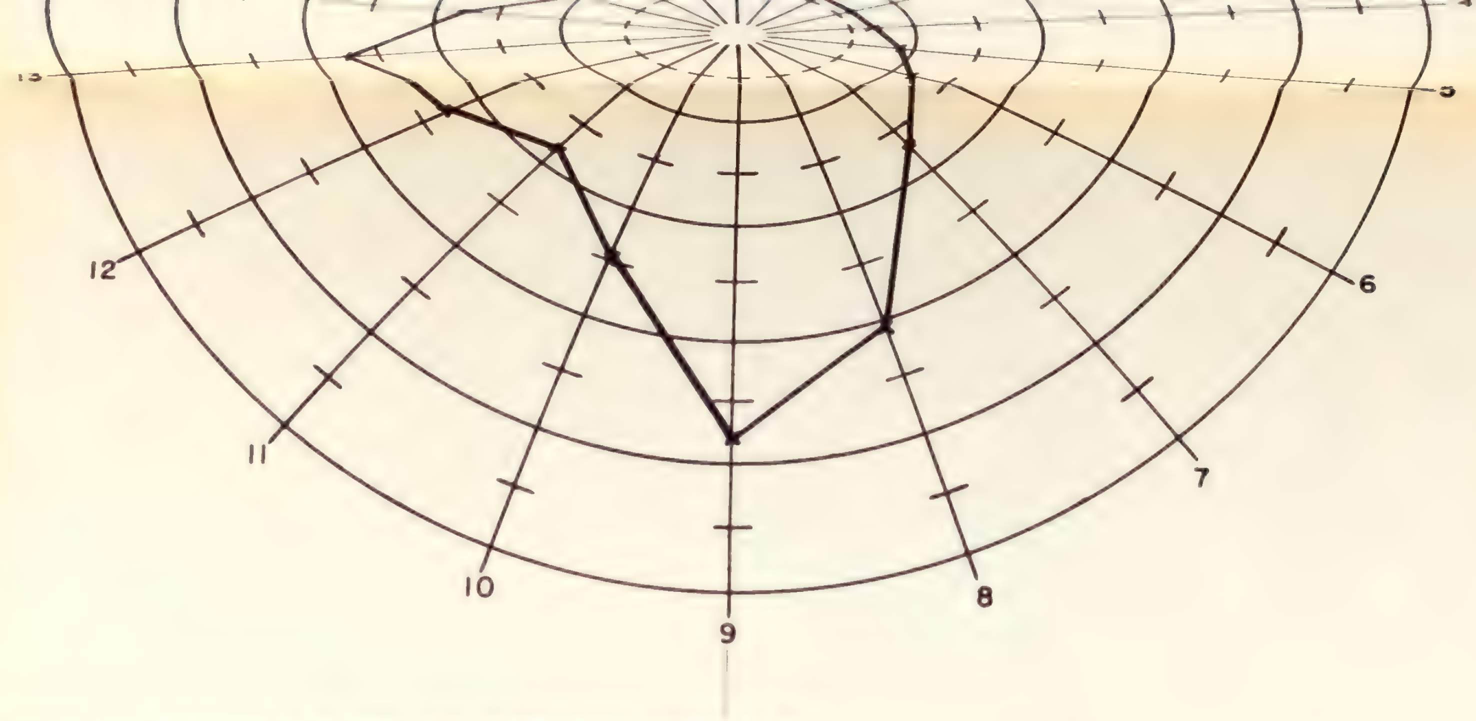
Schlumberger

RADIORIENTATION PLOT

POT-B

3 SHORT STRING PERFORATED 1172-1182 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





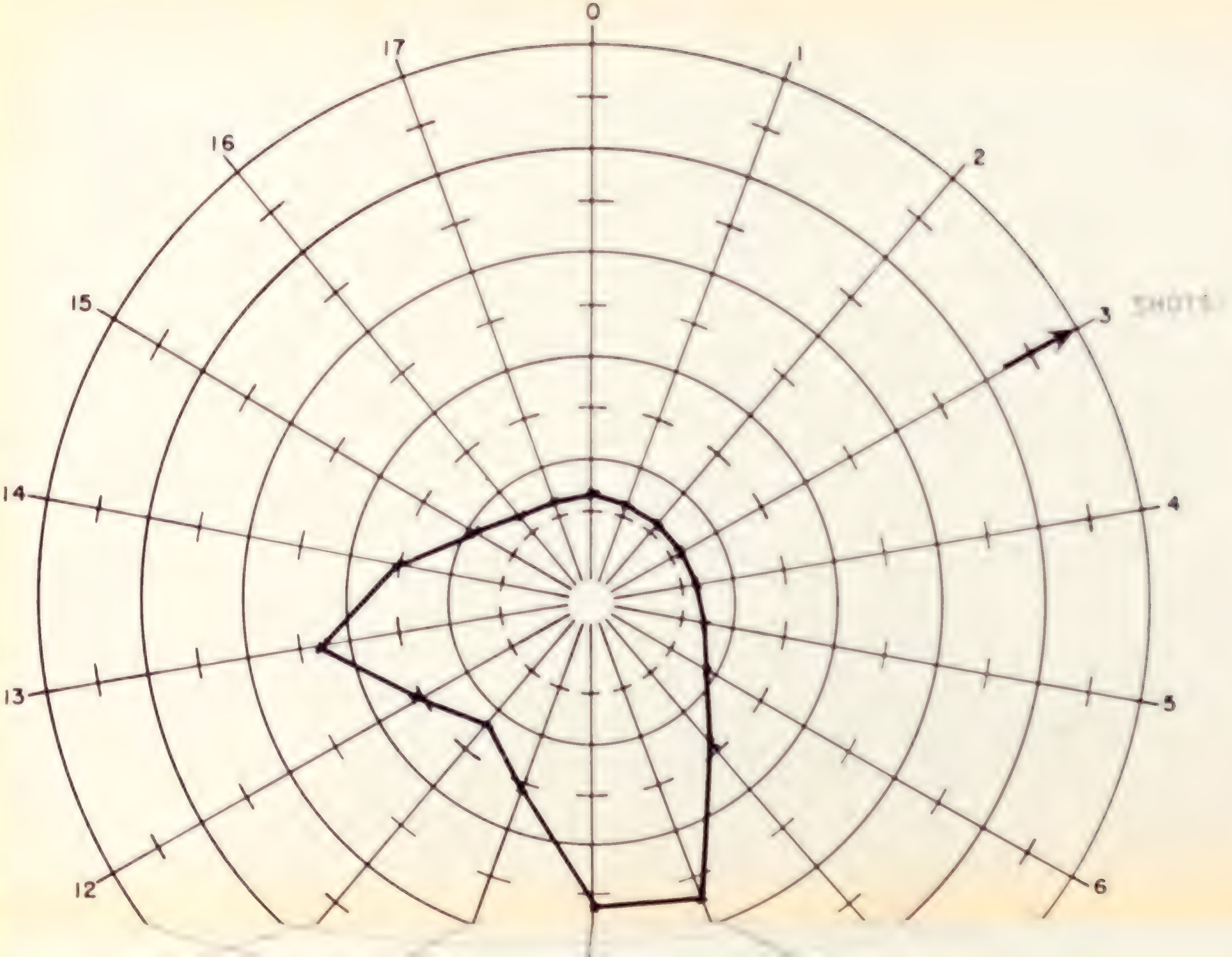
art, computation and or interpretation of our readings from our gamma gamma orientation and de
nstrument is presented to you in accordance with, but subject to, the General Terms and Conditions
set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
our Service Order for this job. The readings could be adversely affected by vagrant metal in the
e and other conditions unknown to us

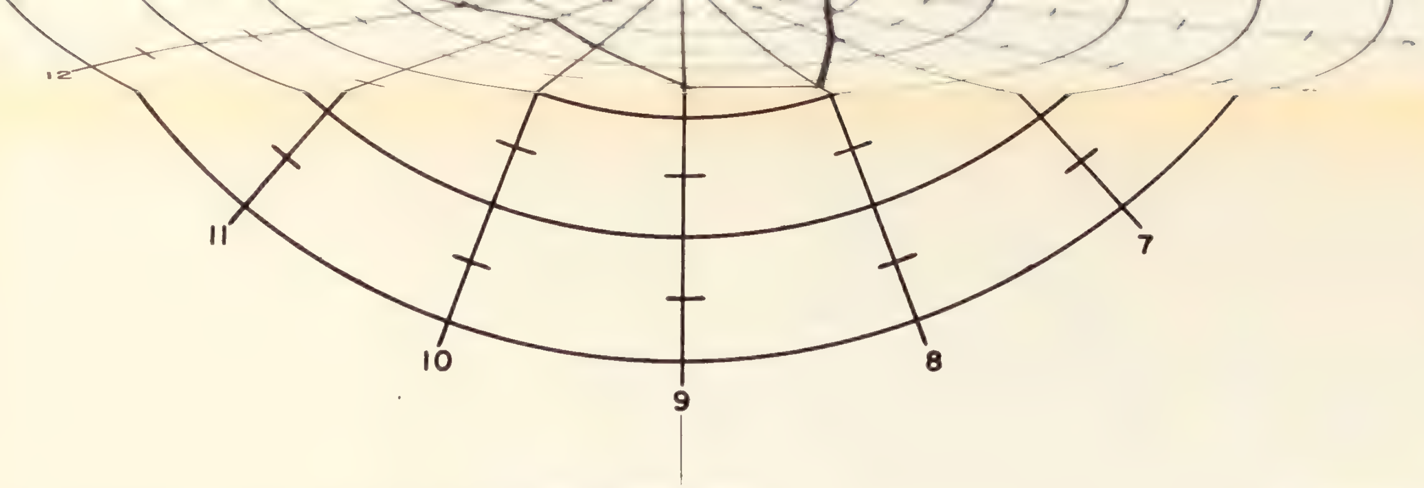
Schlumberger

RADIORIENTATION PLOT

POT-B

[illegible] INDICATES [illegible] ONE SHOT PER FOOT WITH [illegible]





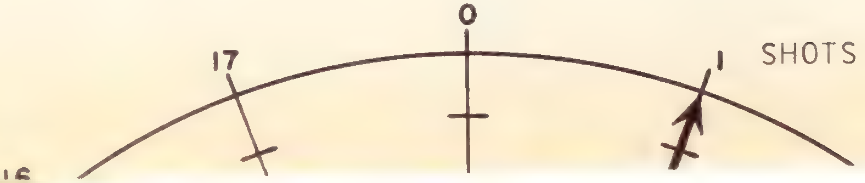
ərt, computation and/or interpretation of our readings from our gamma-gamma orientation and de- instrument is presented to you in accordance with, but subject to, the General Terms and Conditions set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse our Service Order for this job. The readings could be adversely affected by vagrant metal in the le and other conditions unknown to us.

Schlumberger

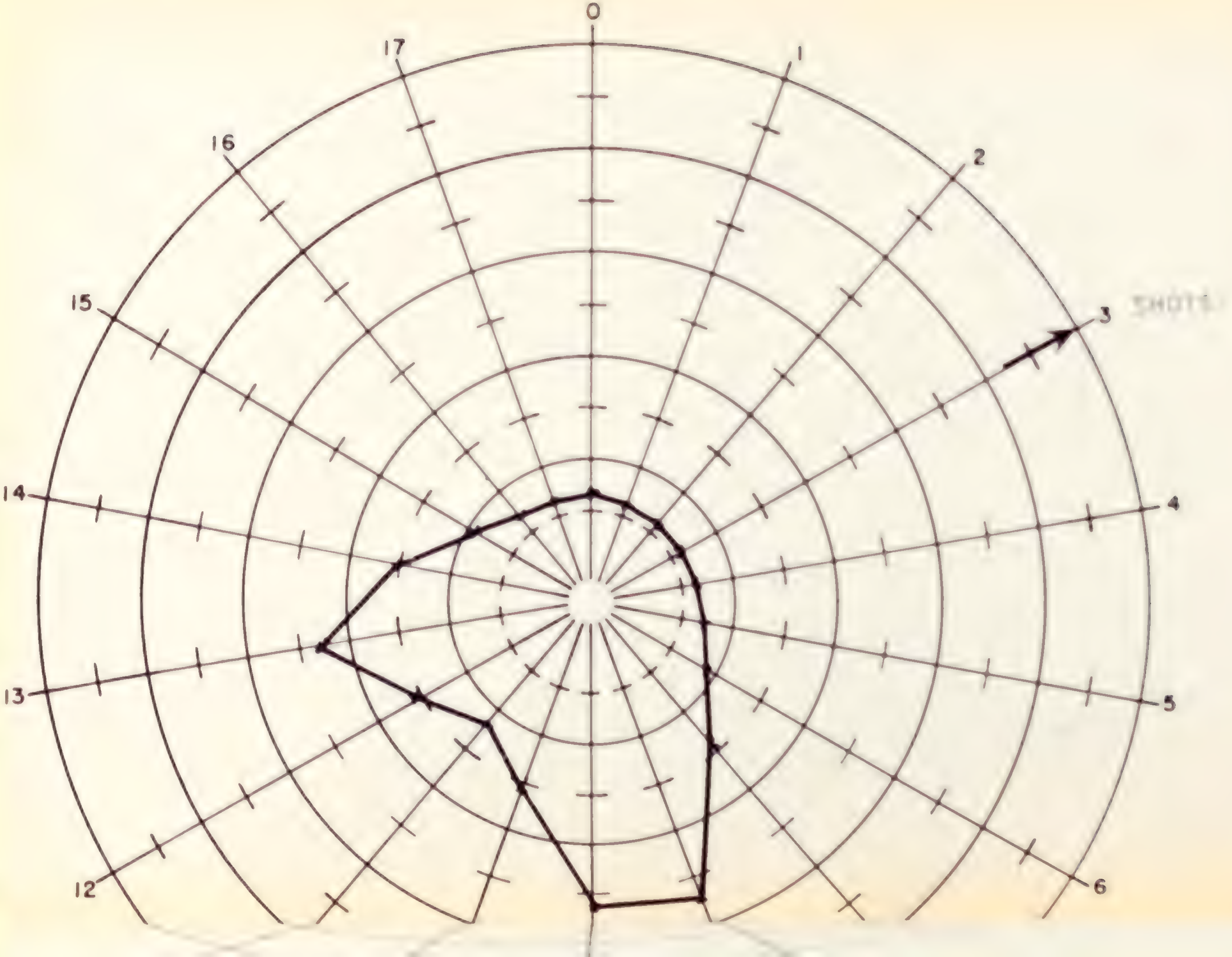
RADIORIENTATION PLOT

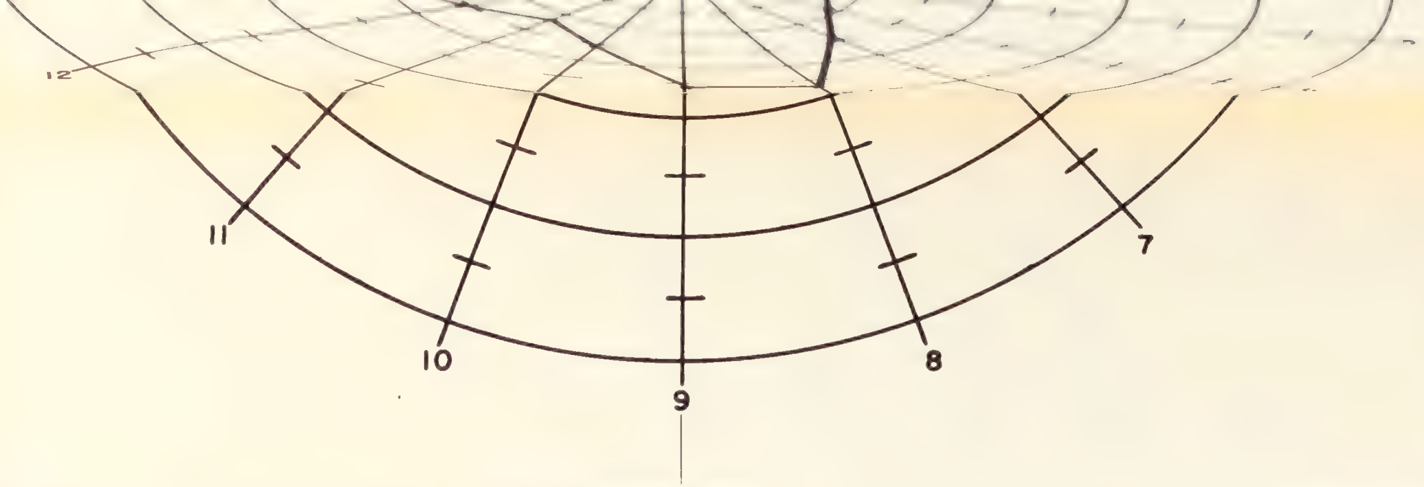
POT-B

.3·SHORT STRING PERFORATED 1150-1160 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME



[illegible] PERFORATED [illegible] ONE SHOT PER FOOT WITH [illegible]





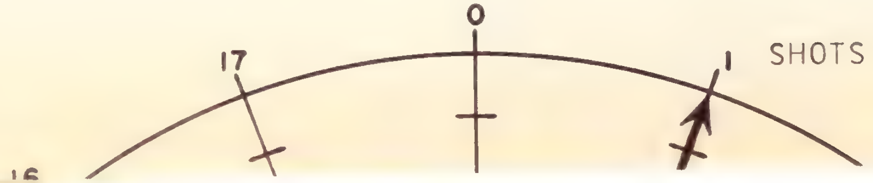
ırt, computation and/or interpretation of our readings from our gamma-gamma orientation and de-
instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
our Service Order for this job. The readings could be adversely affected by vagrant metal in the
le and other conditions unknown to us.

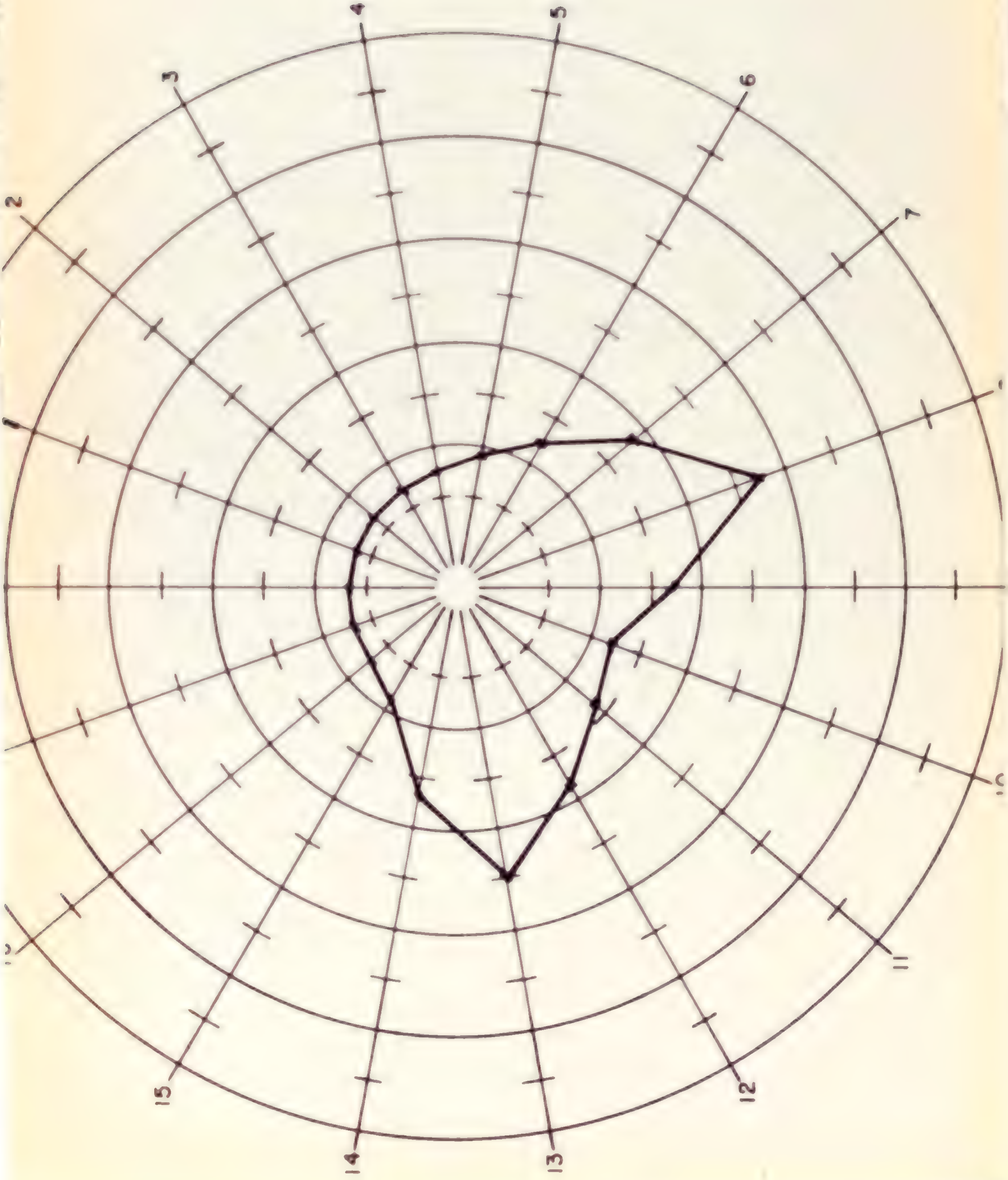
Schlumberger

RADIORIENTATION PLOT

POT-B

.3 SHORT STRING PERFORATED 1150-1160 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




1
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12
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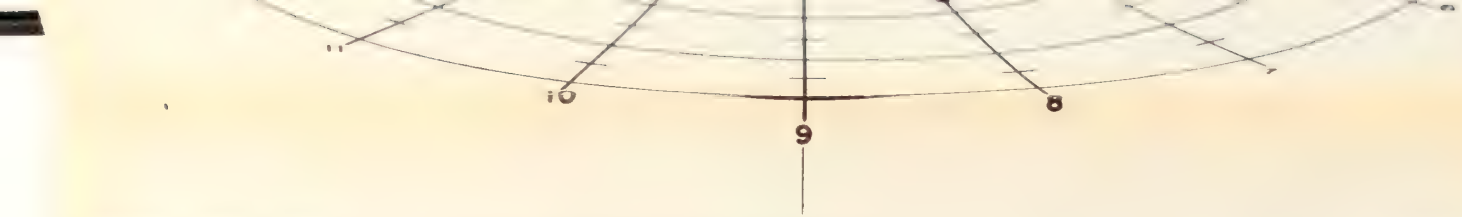
14
15



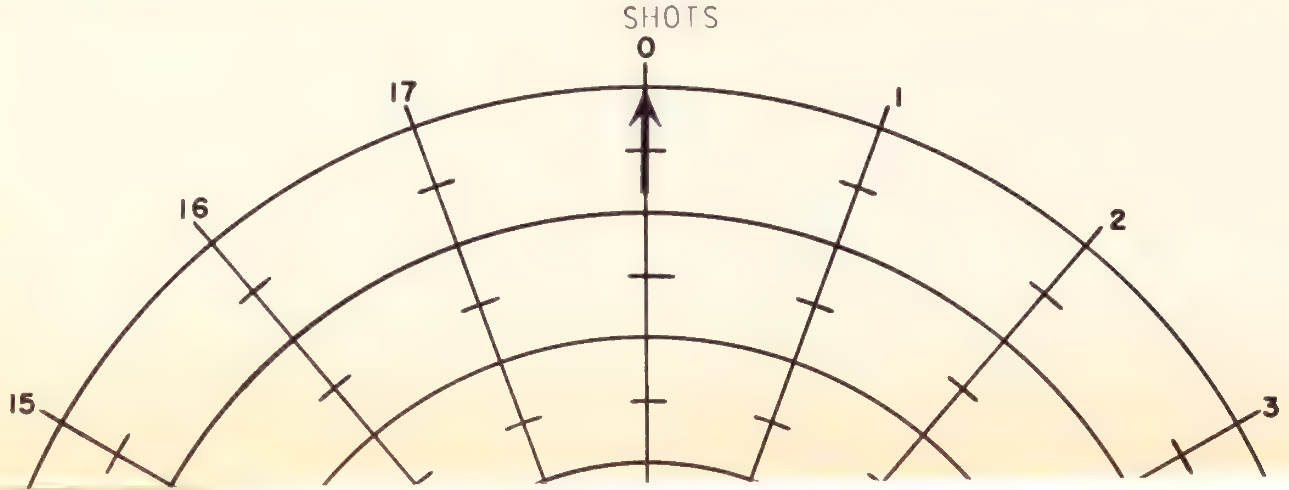
rt, computation and/or interpretation of our readings from our gamma-gamma orientation and de-
nstrument is presented to you in accordance with, but subject to, the General Terms and Conditions
set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
our Service Order for this job. The readings could be adversely affected by vagrant metal in the
e and other conditions unknown to us.

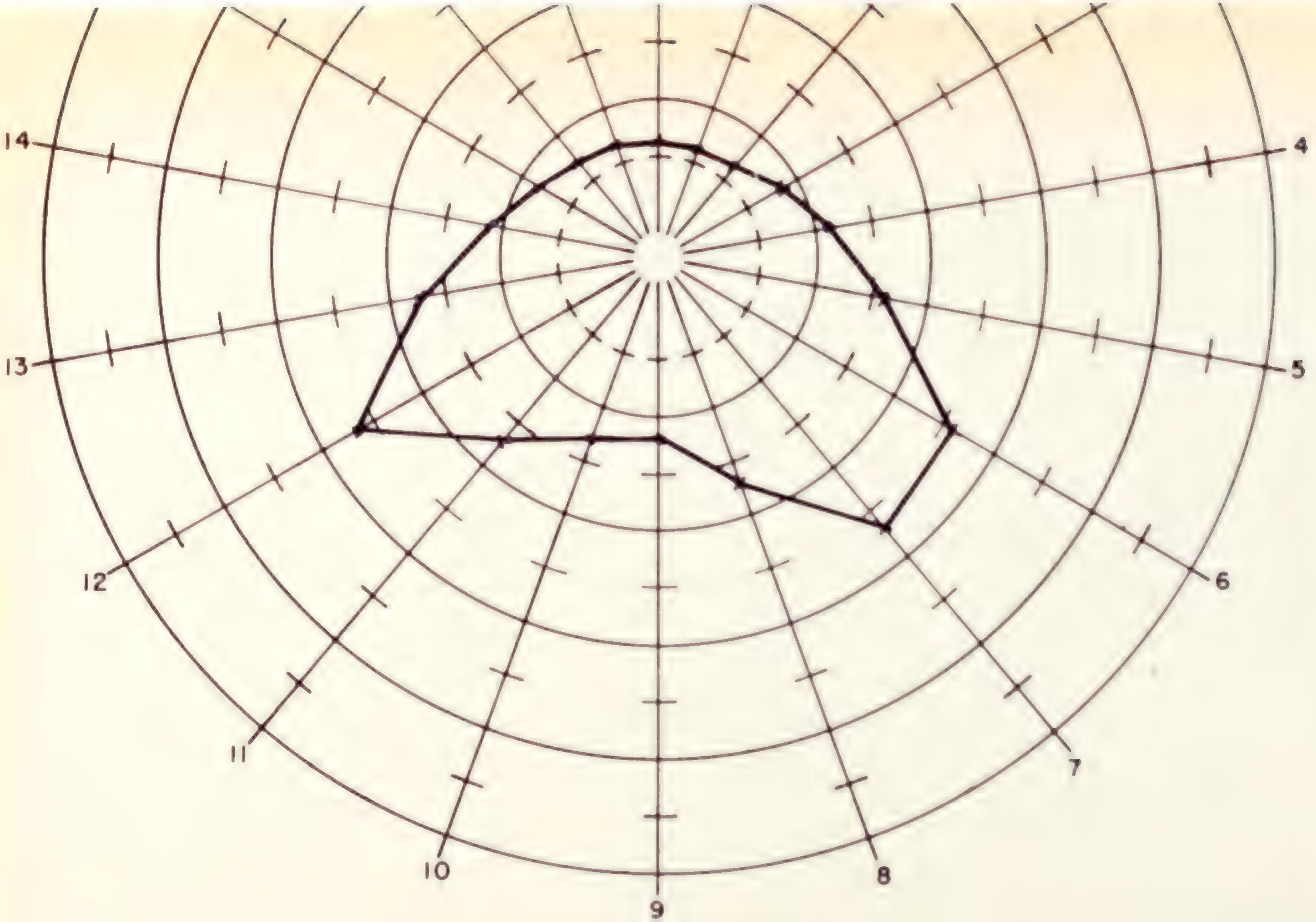
Schlumberger

RADIORIENTATION PLOT

POT-B

.3 -SHORT STRING PERFORATED 1139-1149 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





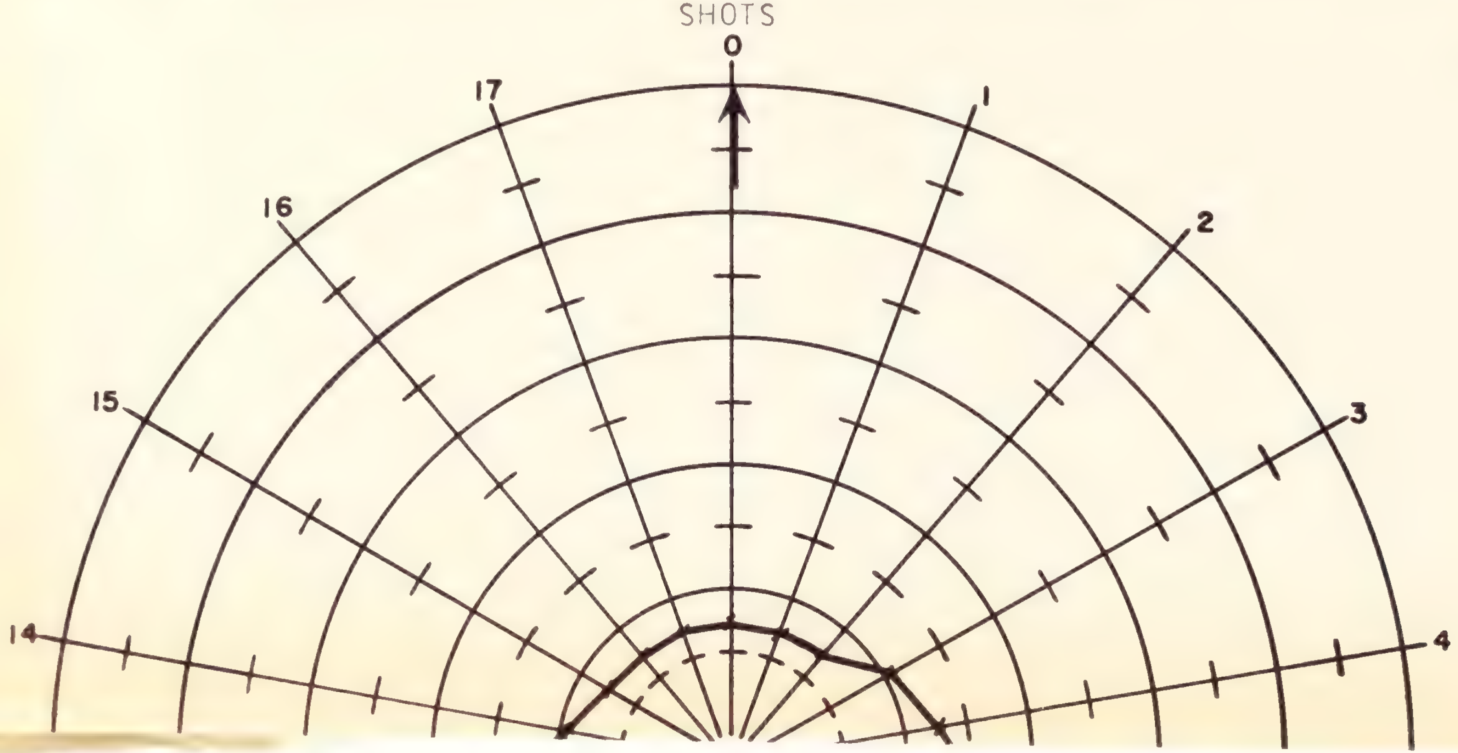
[illegible]

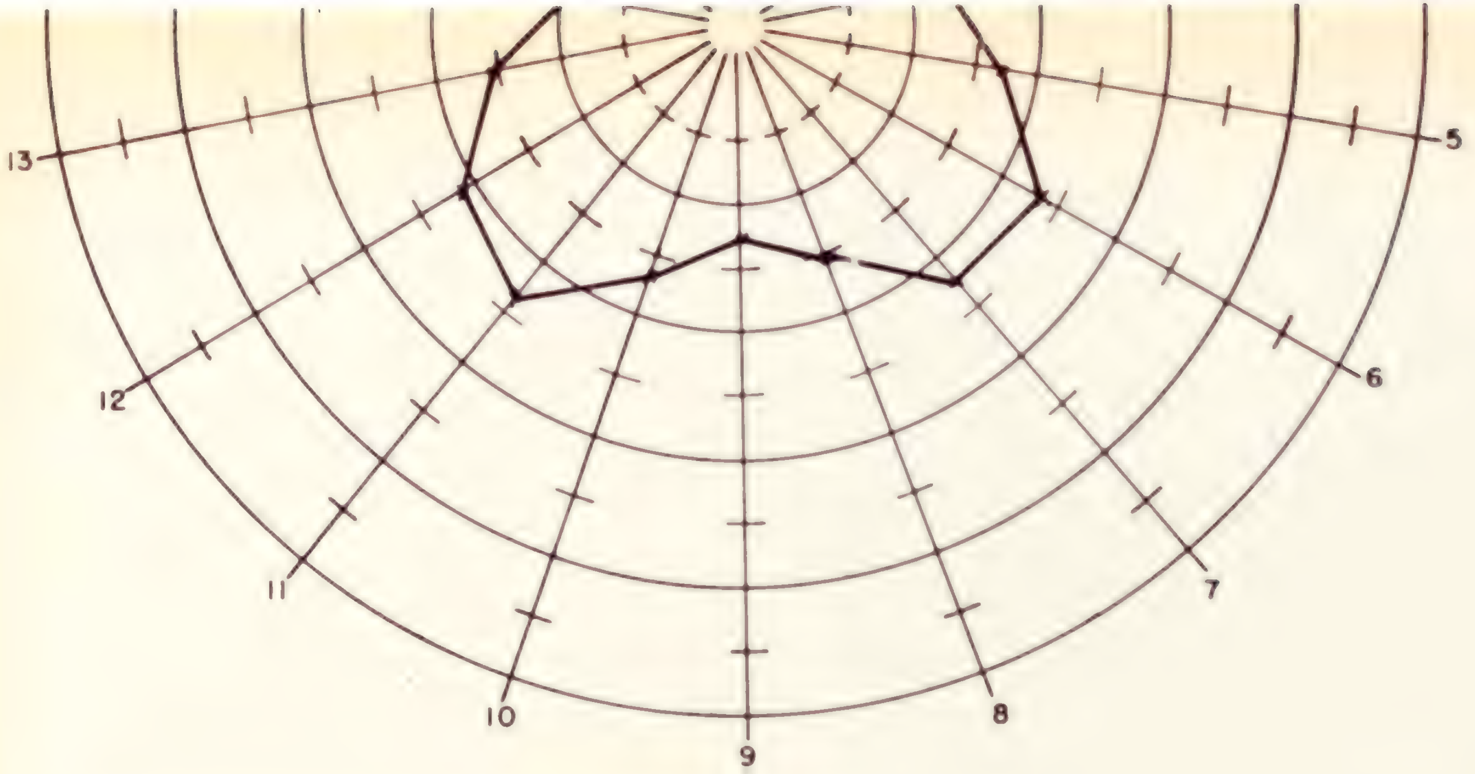
Schlumberger

RADIORIENTATION PLOT

POT-B

O.3 SHORT STRING PERFORATED 1128-1138 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





chart, computation and/or interpretation of our readings from our gamma-gamma [illegible] tool to
ng instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
re set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
of our Service Order for this job. The readings could be adversely affected by magnet metal in the
hole and other conditions unknown to us.

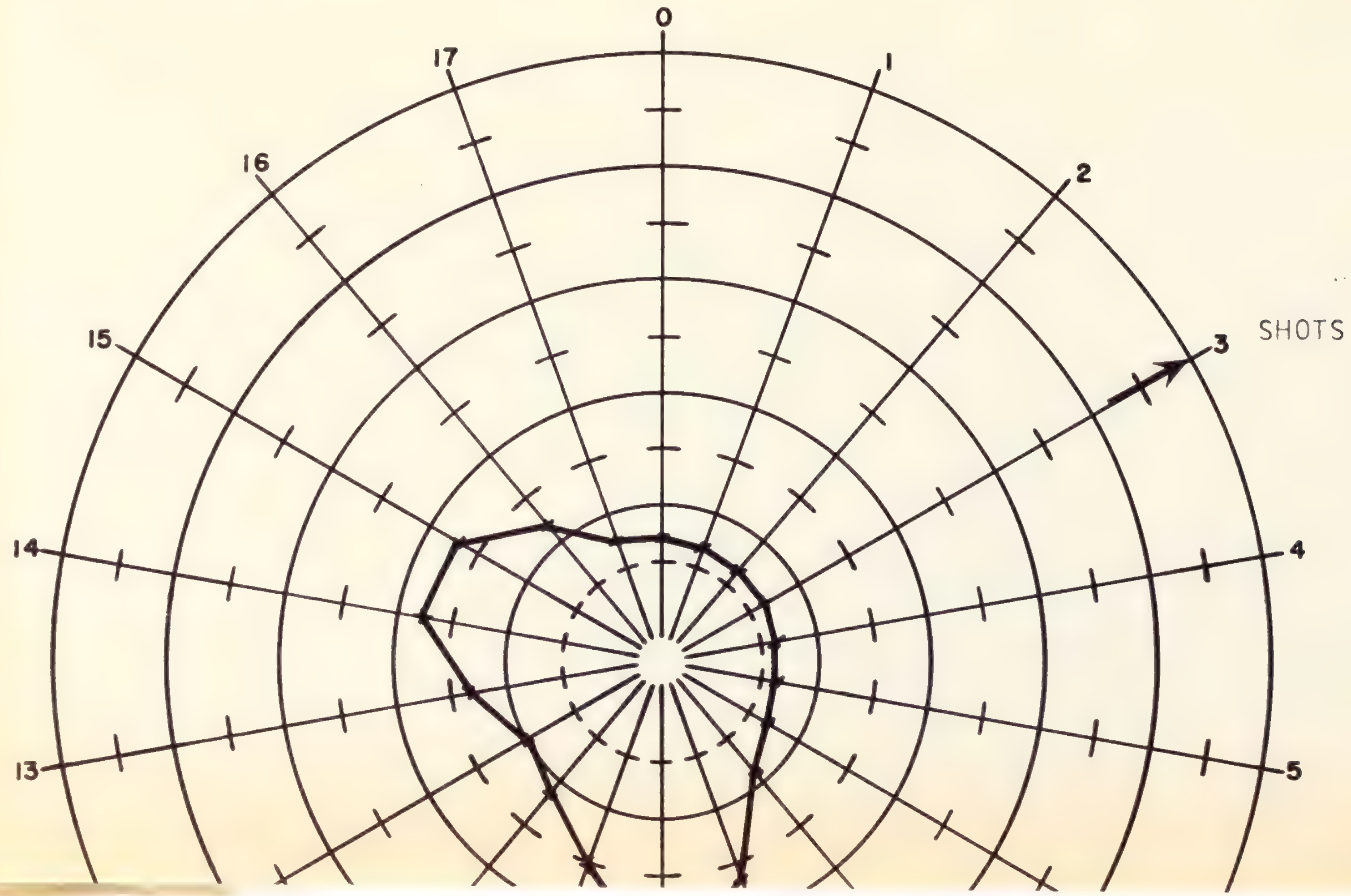
Schlumberger

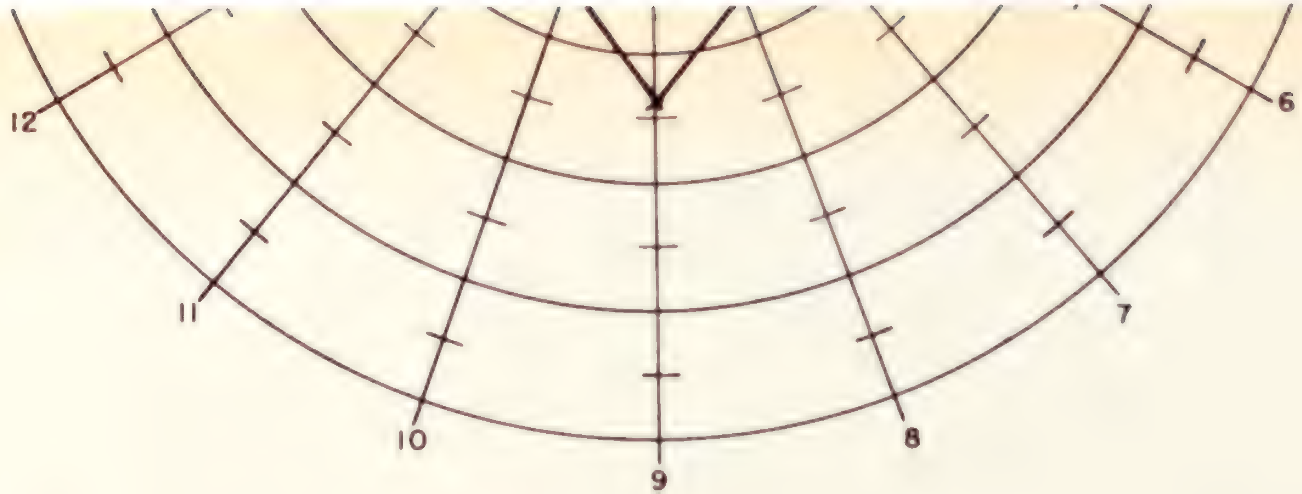
RADIORIENTATION PLOT

RADIORIENTATION PLOT

POT-B

NO. 3 SHORT STRING PERFORATED 1117-1127 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





his chart, computation and/or interpretation of our readings from our gamma-gamma orientation and te
ecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
s are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
ide of our Service Order for this job. The readings could be adversely affected by magnetic metal in the
rill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

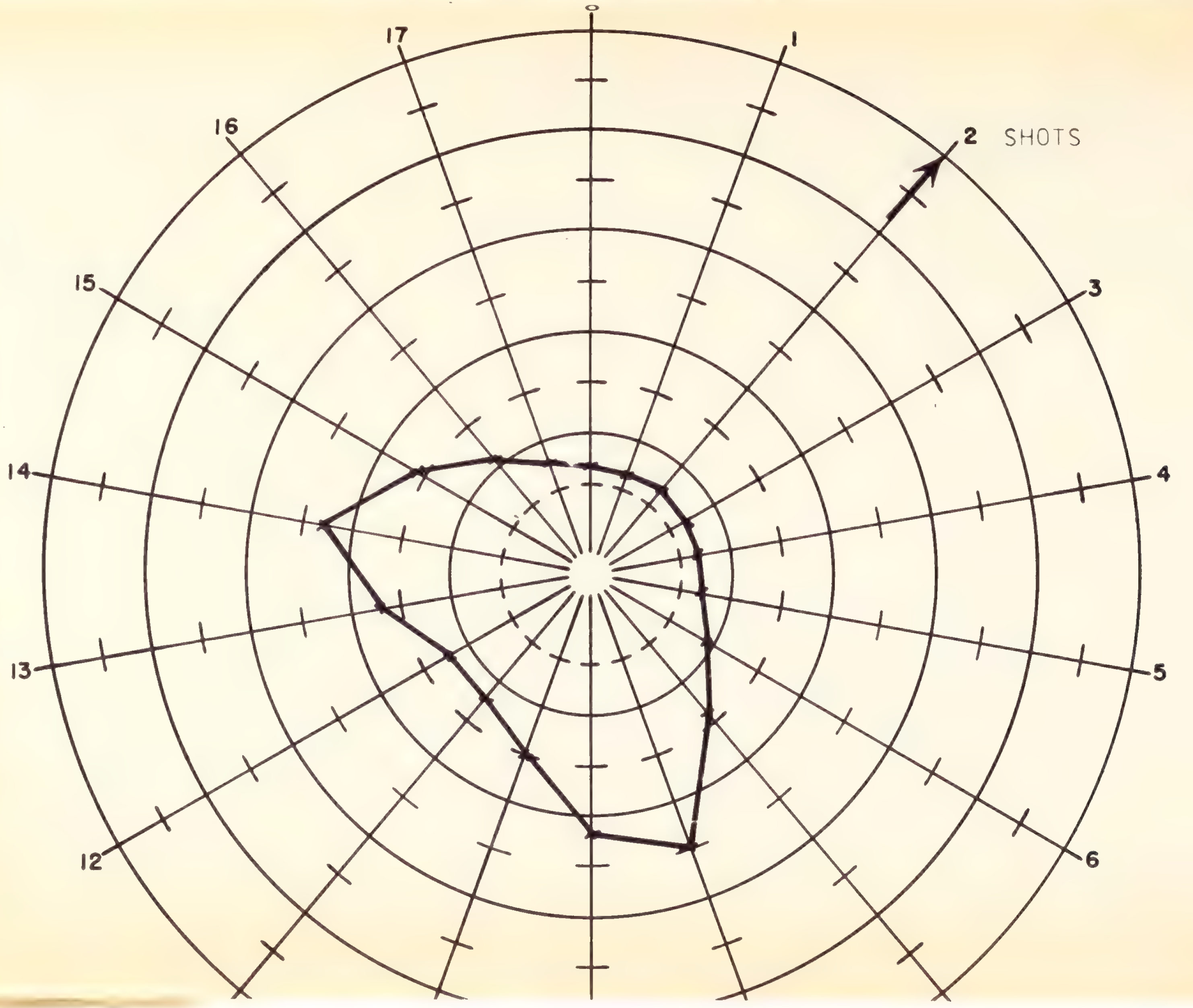
POT-B

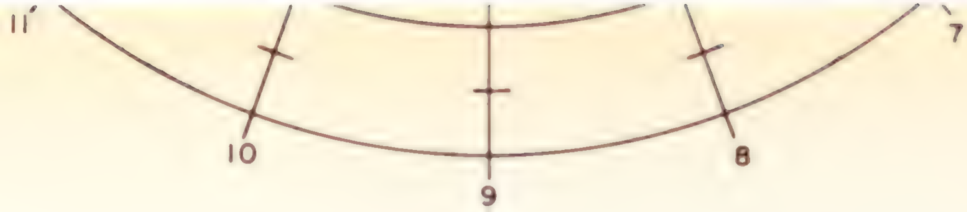
NO. 3-SHORT STRING PERFORATED 1106-1116 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

RADIORIENTATION PLOT

POT-B

[illegible] PERFORATED [illegible] ONE SHOT PER FOOT WITH [illegible] HYPERDOME





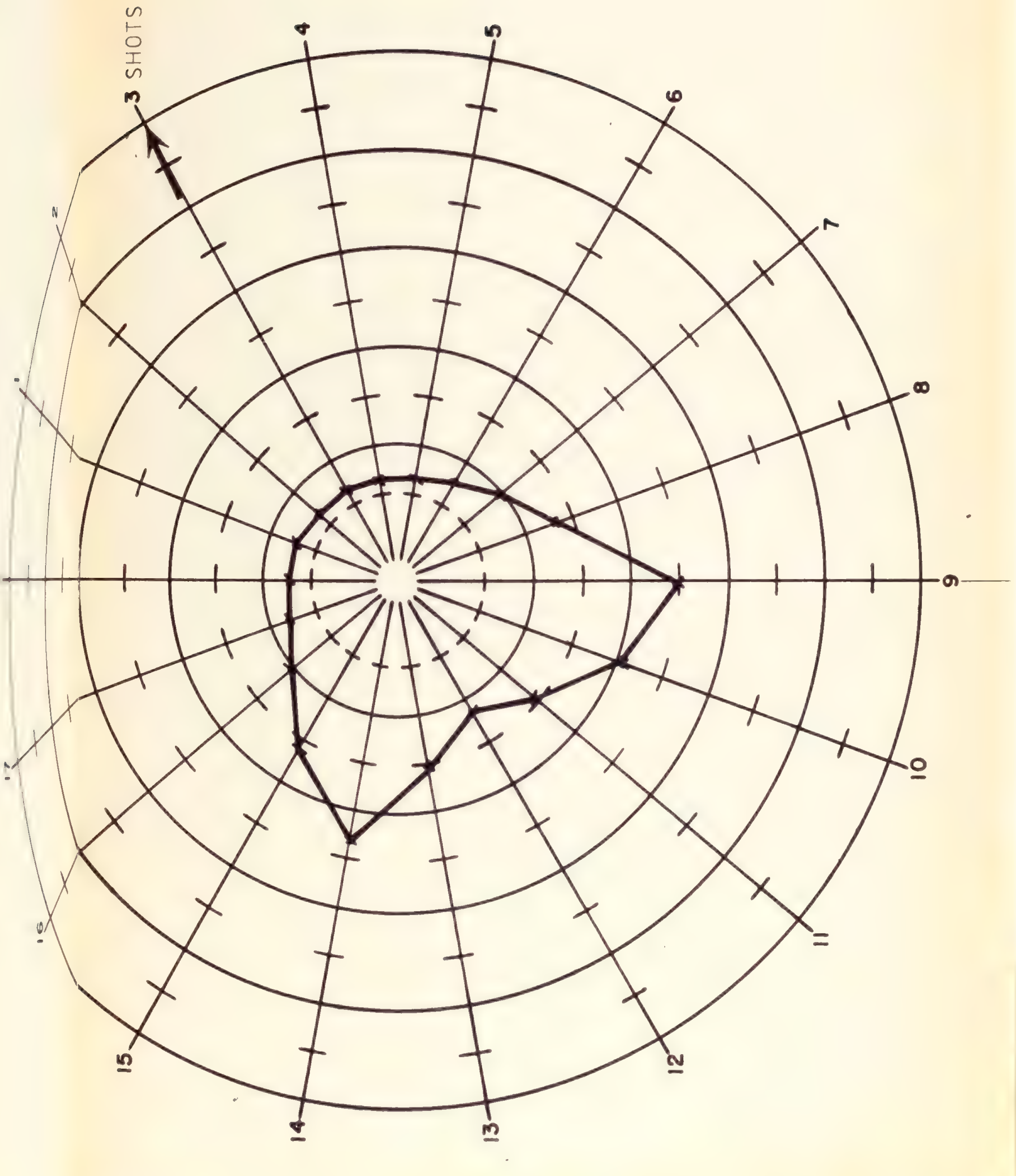
This chart, computation and/or interpretation of our readings from our [illegible] apparatus and its testing instrument is presented to you in accordance with but subject to the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule (and which are on the reverse side of our Service Order for this job). The readings could be adversely affected by conditions in the drill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B

NO.3 SHORT STRING PERFORATED 1095-1105 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


3 SHOTS
1
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16
17

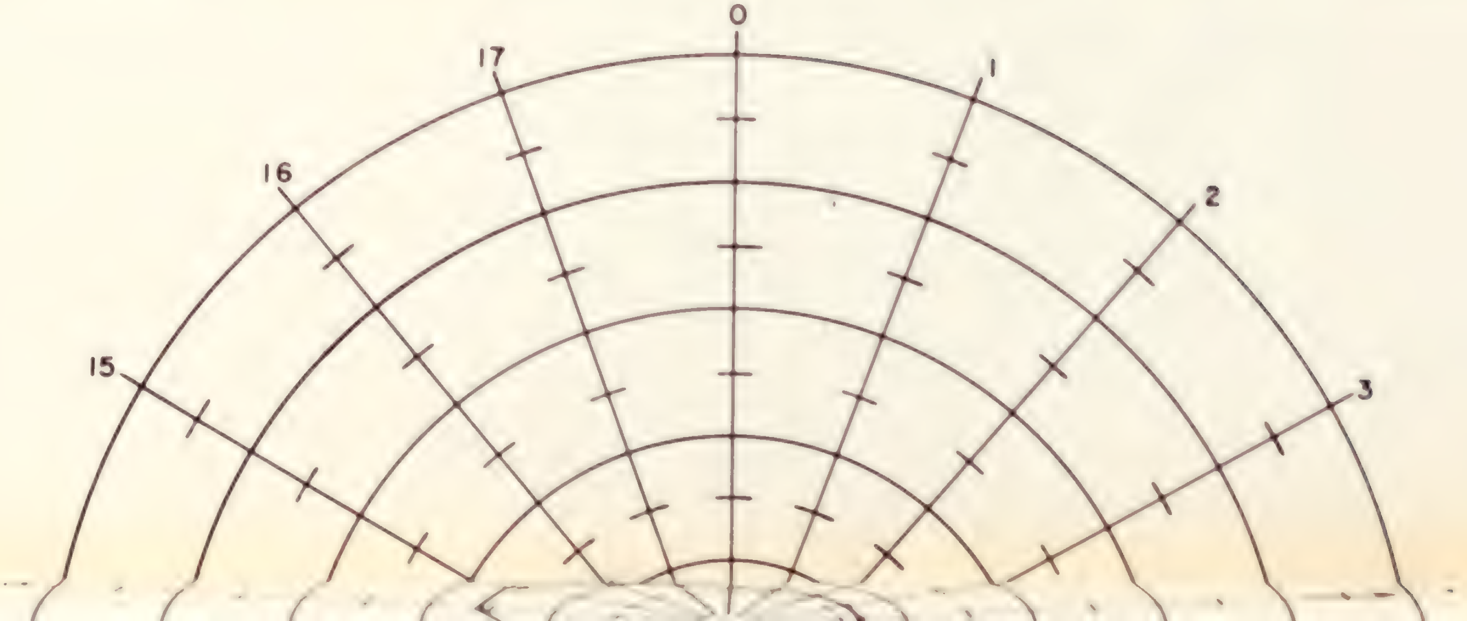
This chart, computation and/or interpretation [illegible]

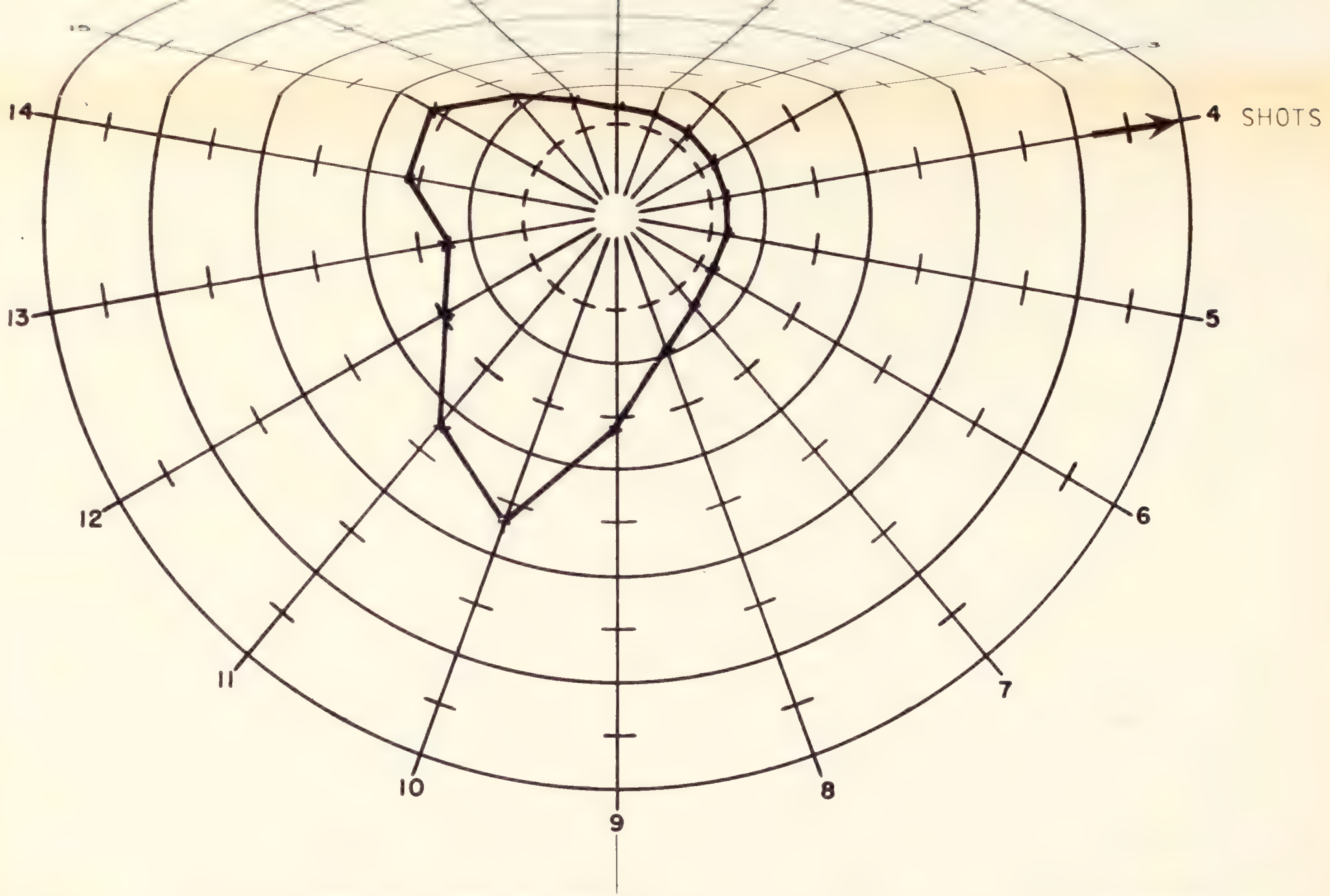
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 3 SHORT STRING PERFORATED 1090-1094 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





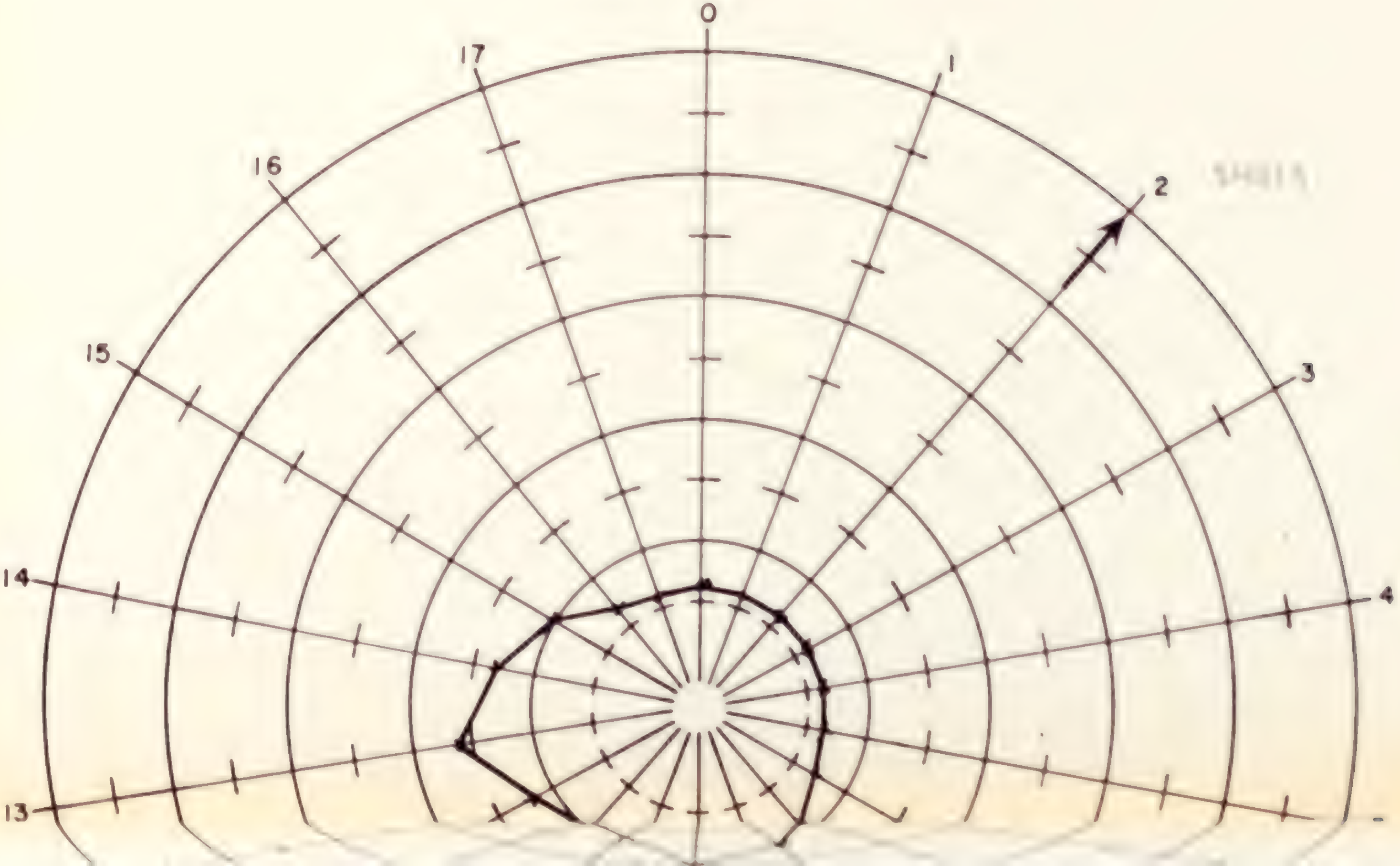
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

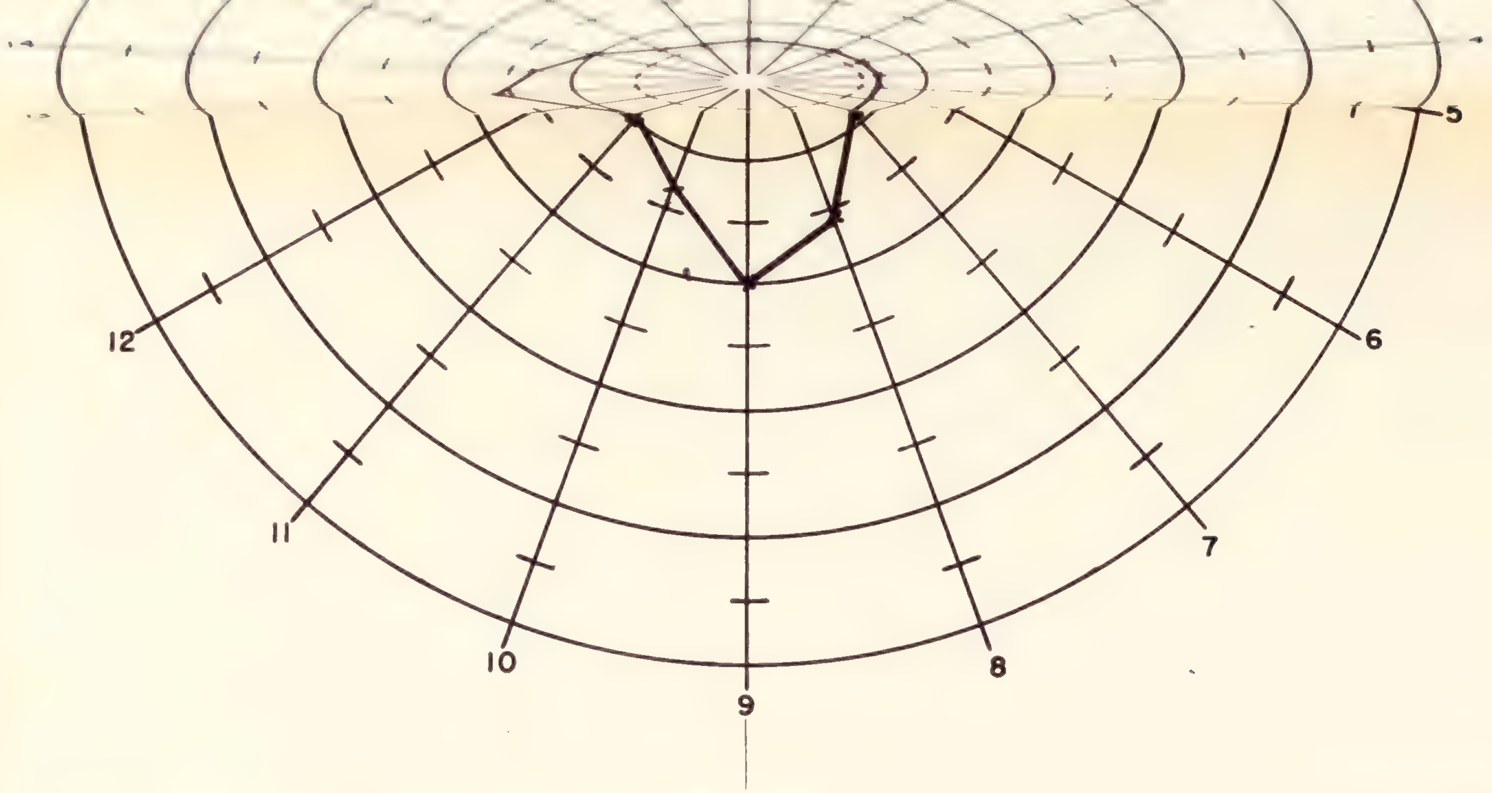
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 3 SHORT STRING PERFORATED 1078-1089 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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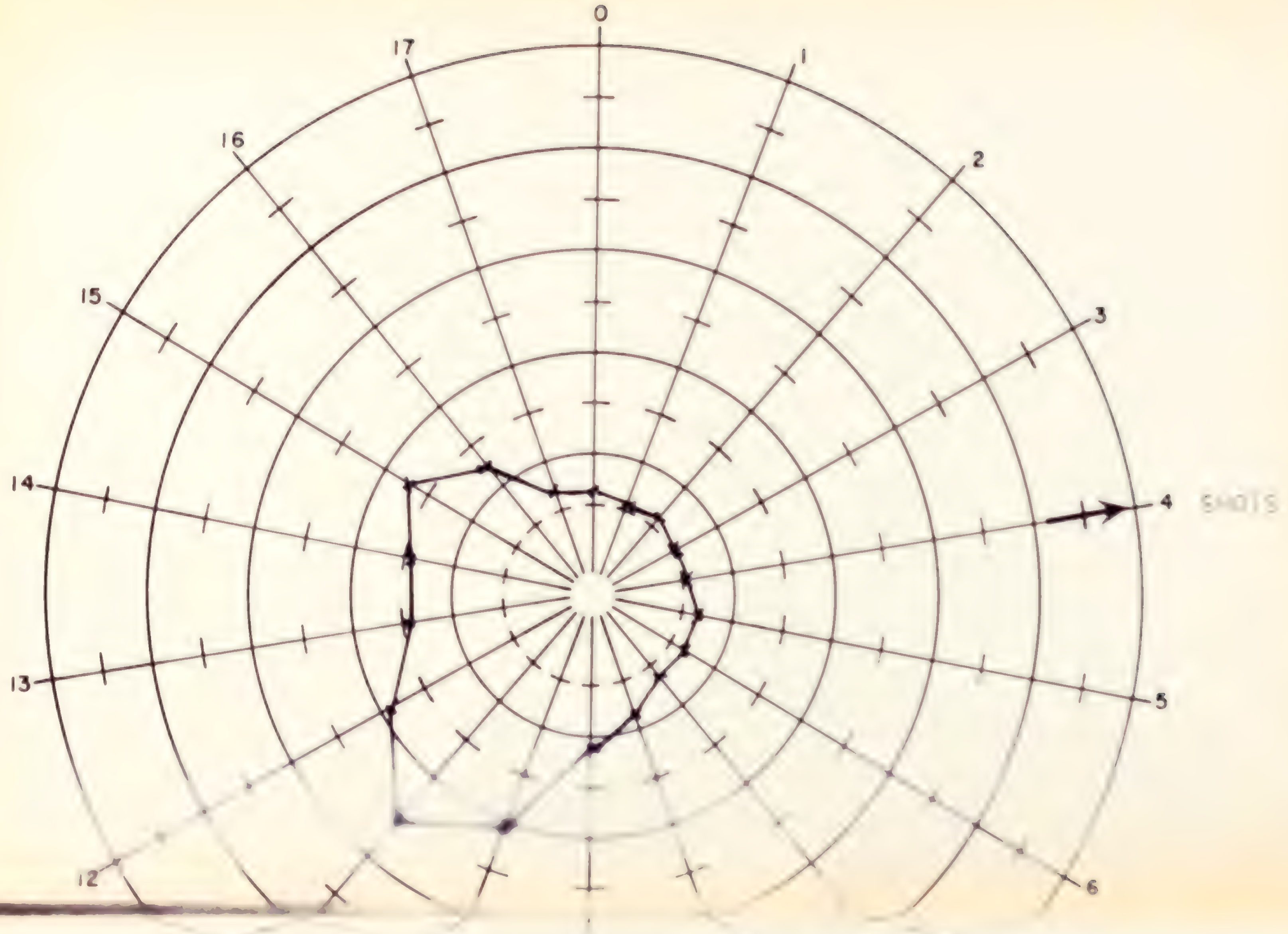
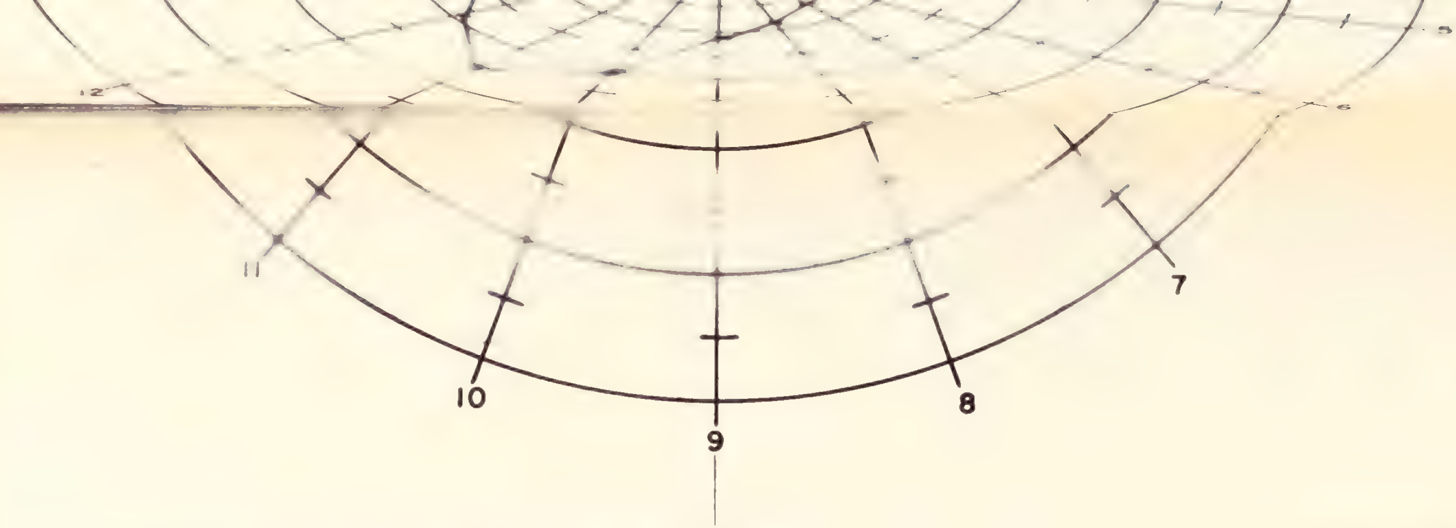
RADIORIENTATION PLOT
POT-B

[illegible] RIGHT SIDE [illegible] ONE SHOT PER FOOT [illegible]





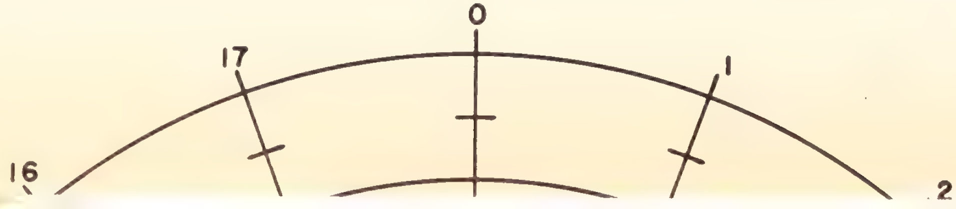
is chart, computation and or interpretation of our readings from our gamma-gamma orientation and de-
cting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
de of our Service Order for this job. The readings could be adversely affected by vagrant metal in the
ll hole and other conditions unknown to us

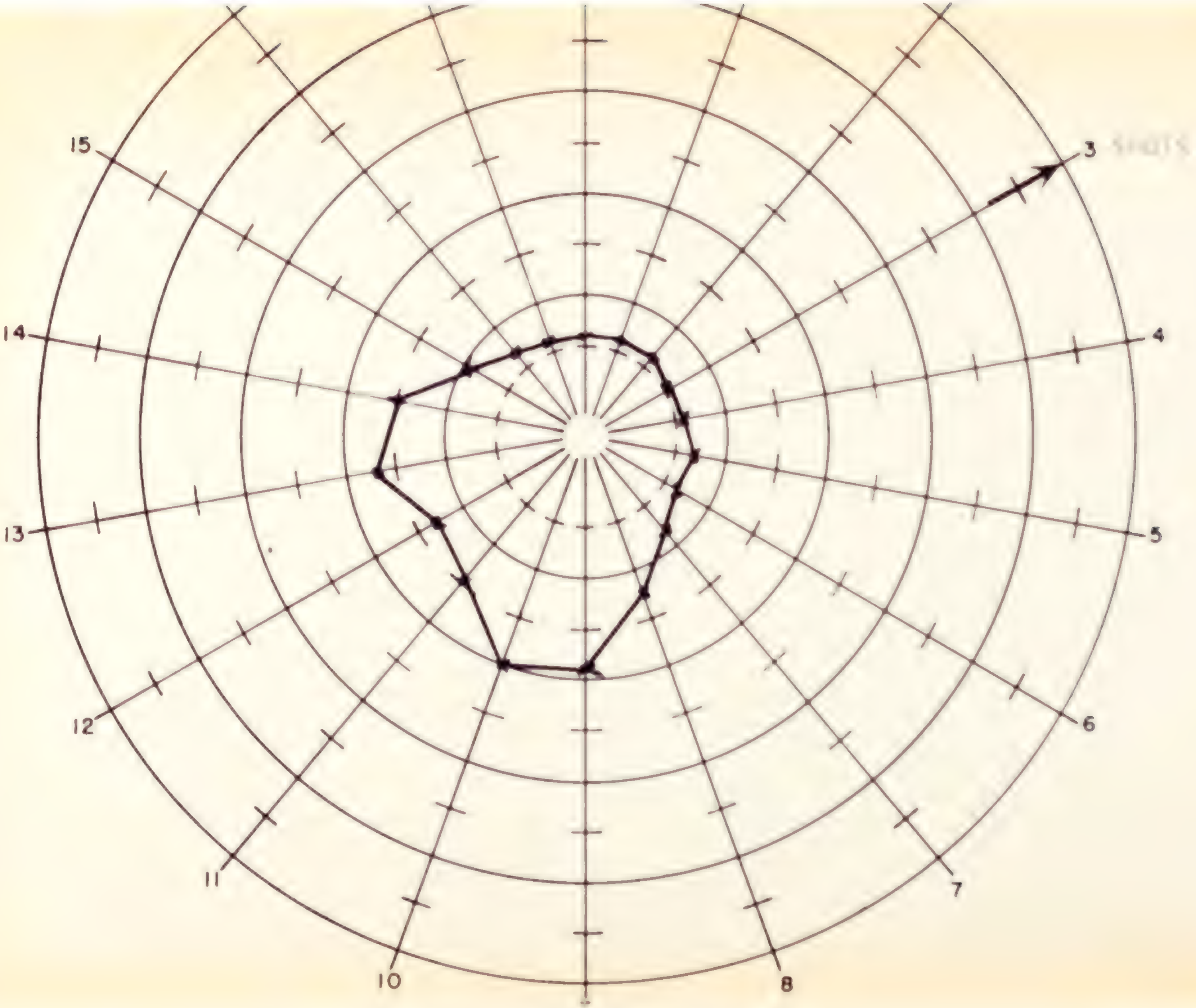
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.3 SHORT STRING PERFORATED 1957-1967 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




3 SHOTS
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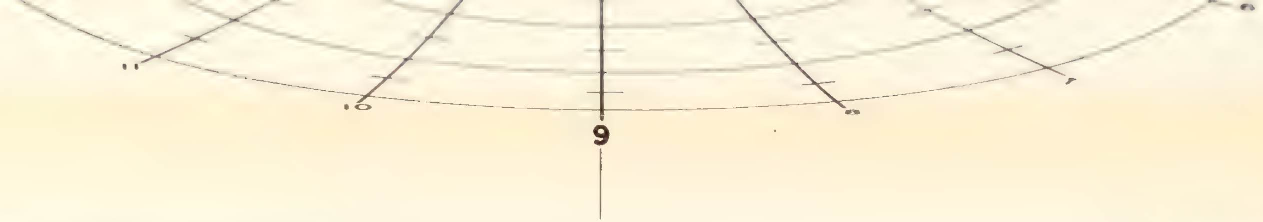


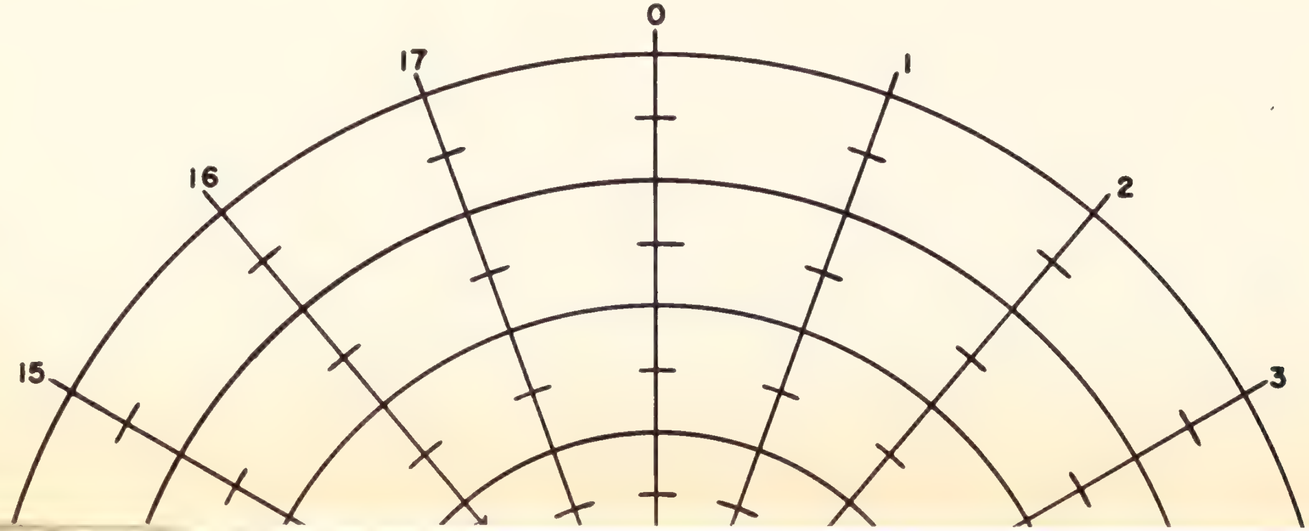
s chart, computation and/or interpretation of our readings from our gamma-gamma orientation and de-
:ting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
le of our Service Order for this job. The readings could be adversely affected by vagrant metal in the
·ll hole and other conditions unknown to us.

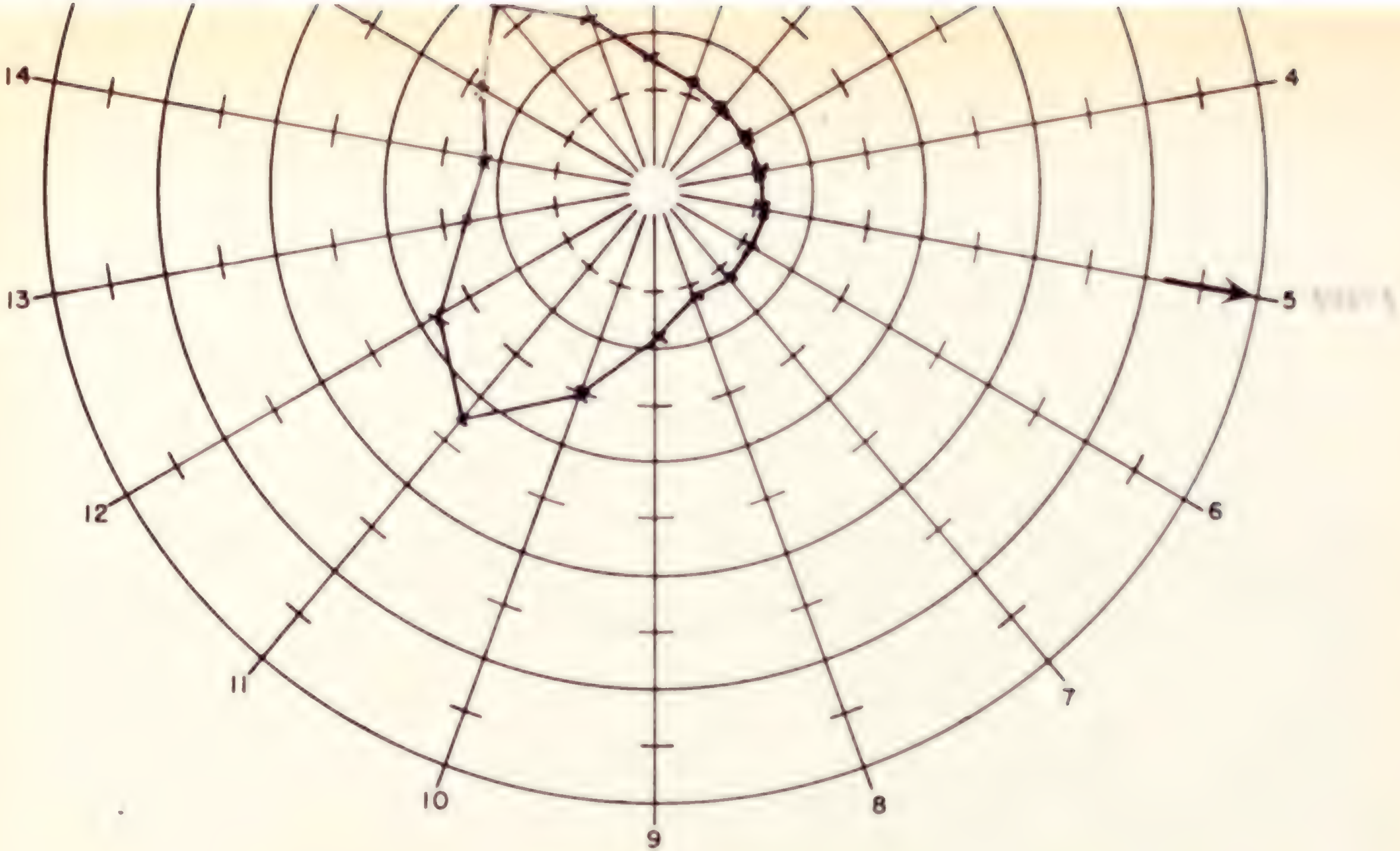
Schlumberger

RADIORIENTATION PLOT

POT-B

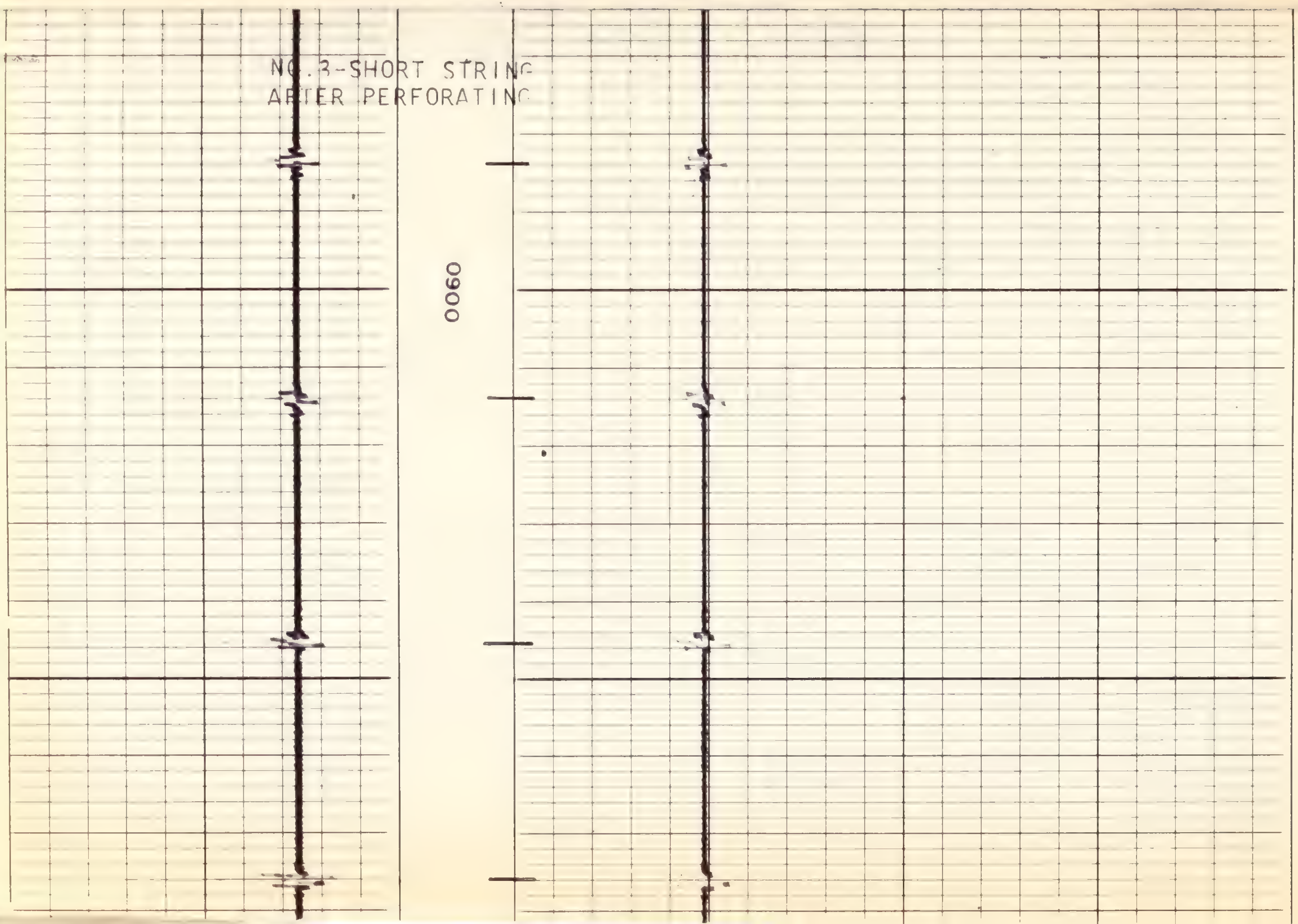
NO.3 SHORT STRING PERFORATED 1050-1056 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

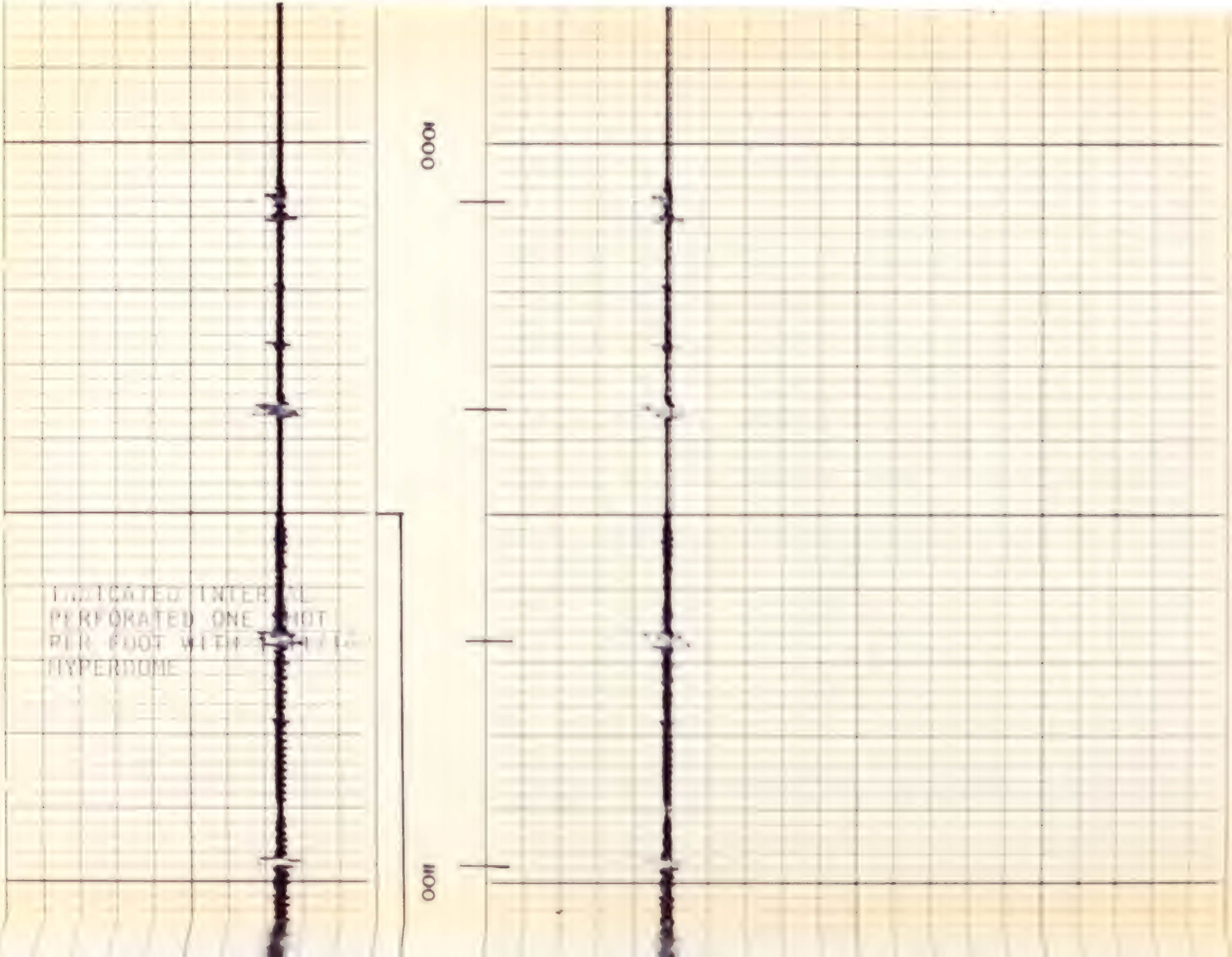


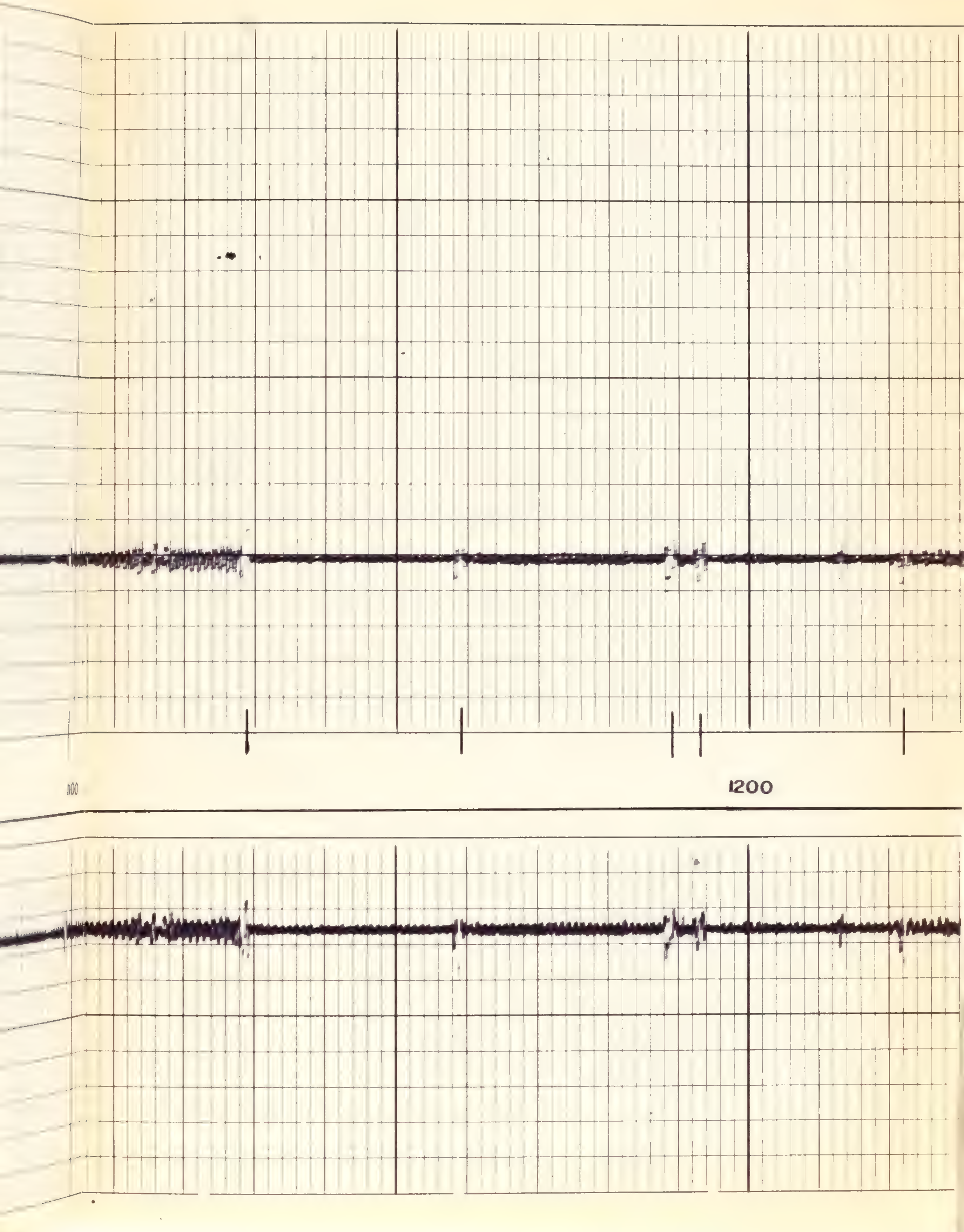


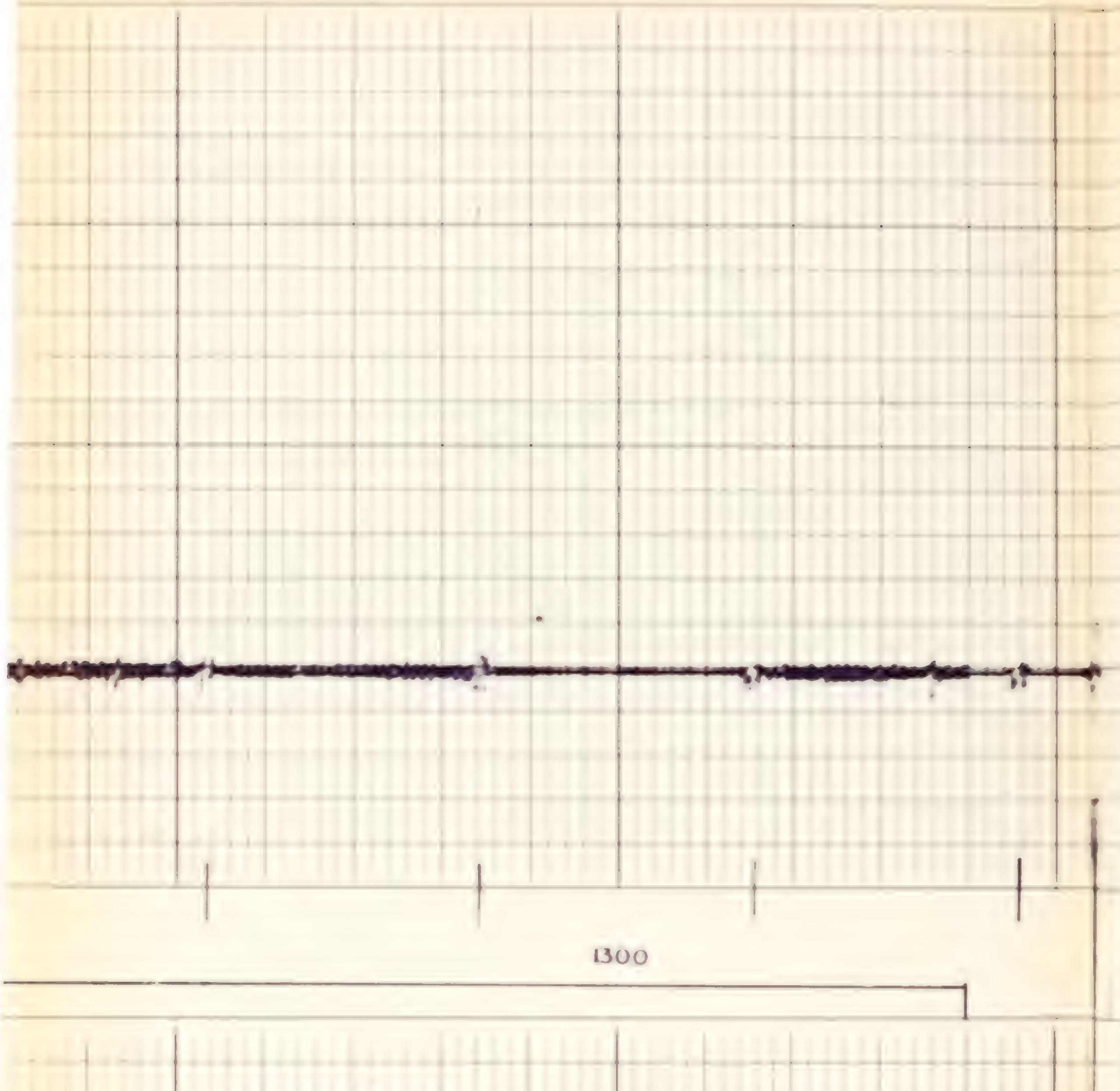
This chart, computation and or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by [illegible] of the drill hole and other conditions unknown to us.

SCHLUMBERGER


NO.3-SHORT STRING
AFTER PERFORATING
0900


1000
1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH [illegible]
HYPERDOME


1100
1200


1300

COMPANY ATLANTIC RICHFIELD COMPANY

WELL AT-1C

FIELD SORGHUM GULCH

RIO BLANCO, COLORADO

Schlumberger

PRODUCTION LOGGING SERVICES

SWS-1425-B

Schlumberger

SIMULTANEOUS

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY RIO BLANCO, COLO.
FIELD or LOCATION SORGHAM GULCH
WELL AQUIFER TEST #1-C
COMPANY ATLANTIC RICHFIELD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL AQUIFER TEST #1-C

FIELD SORGHAM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: API Serial No.

Sec. 7 Twp. 3 - S Rge. 96-W

Other Services:
DIL
BHC-GR
HRT

Permanent Datum: GL ; Elev.: 6909
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6909

Date	8/18/74			
Run No.	ONE			
Depth—Driller	1640			
Depth—Logger	1646			
Btm. Log Interval	1645			
Top Log Interval	61			
Casing—Driller	8-5/8 @ 59	@	@	@
Casing—Logger	61			
Bit Size	7-7/8			
Type Fluid in Hole	WATER			
Fluid Level	440			
Dens. | Visc.				
pH | Fluid Los	ml	ml	ml	ml
Source of Sample				
Rmm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc				
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	10 HOURS			
Max. Rec. Temp.	86 °F	°F	°F	°F
Equip. | Location	5602 | G.J.			
Recorded By	BA[illegible]GHOUGHI			
Witnessed By	ELLARD, TAIT			

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No.			
Depth - Driller				
Type Fluid				
Source of Sample				
Rm @ Meas. Temp.	@ °F		@ °F	
Rmf @ Meas. Temp.	@ °F		@ °F	
Rmc @ Meas. Temp.	@ °F			
Rm @ BHT	@ °F			
Dens.	Visc.			
ph	Fluid Loss	ml		ml
% Water by Vol.				
% Oil by Vol.				
% Solids by Vol.				
Solids Av. Sp. Gr.				

EQUIPMENT DATA

Run No.	ONE			
Dens. Pnl.	EA-169			
Dens. Cart.	EA-289			
Dens. Skid	D-688			
Dens. Sde	E-90			
Dens. Source	B-3098			
Dens. Calib.	SFT-106-210			
Neut. Pnl.	A-205			
Neut. Cart.	A-199			
Neut. Source	FA-255			
Neut. Calib.	A-206			
GR Cart.	JA-284			
TTR				
Mem. Pnl.	B-238			

BIT SIZE CASING DATA

Bit	From	To	Csg. Size	Csg. Wt.	From	To

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

LOGGING DATA

CNP

Matrix	Auto Hole Size Corr.	Hole Size Setting (if not auto)	Porosity Scale	From	To
LIMESTONE	☒ Yes ☐ No		20/TK	TD	LS
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				

FDC

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To
1.00	2.71	LIQUID	20/TK	TD	440
.90	2.71	AIR	20/TK	440	CSG

REMARKS

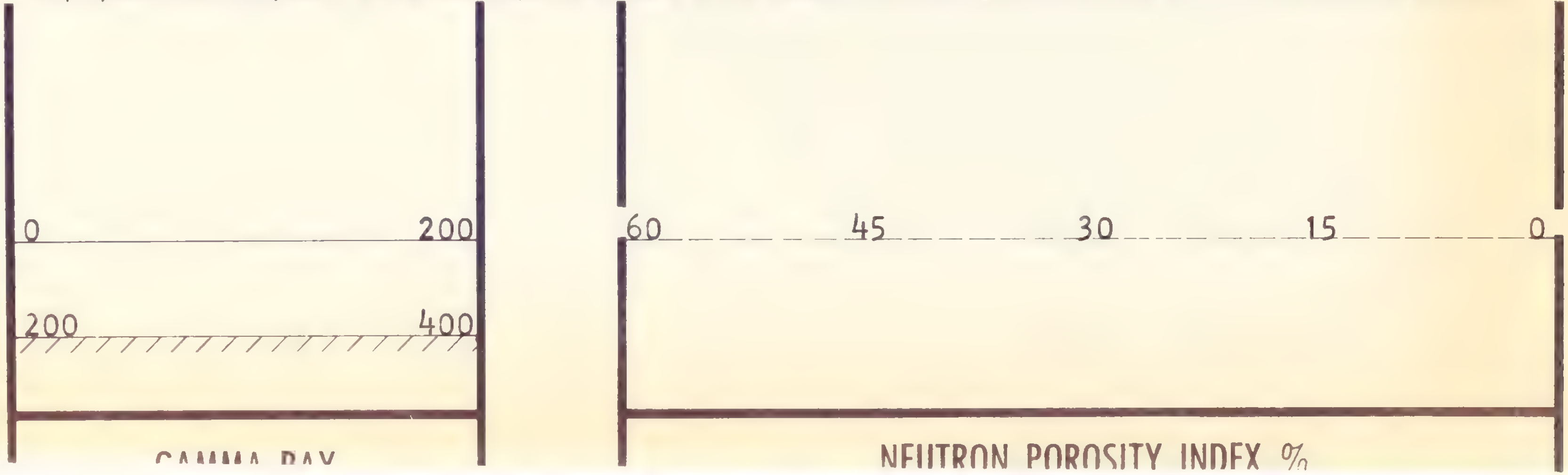
Service Order No. 15129

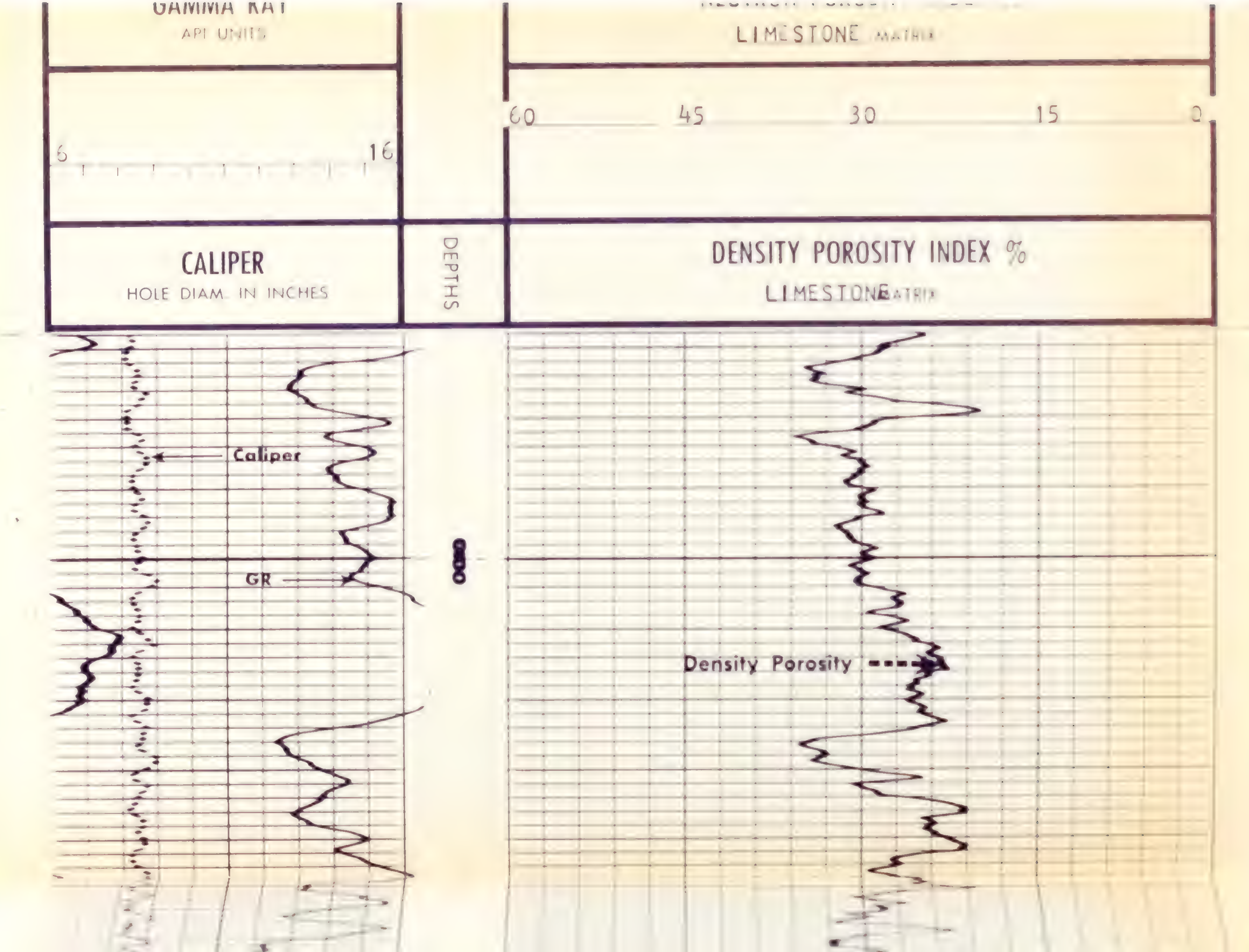
7-/8	61	TD	8-5/8		SURF	61

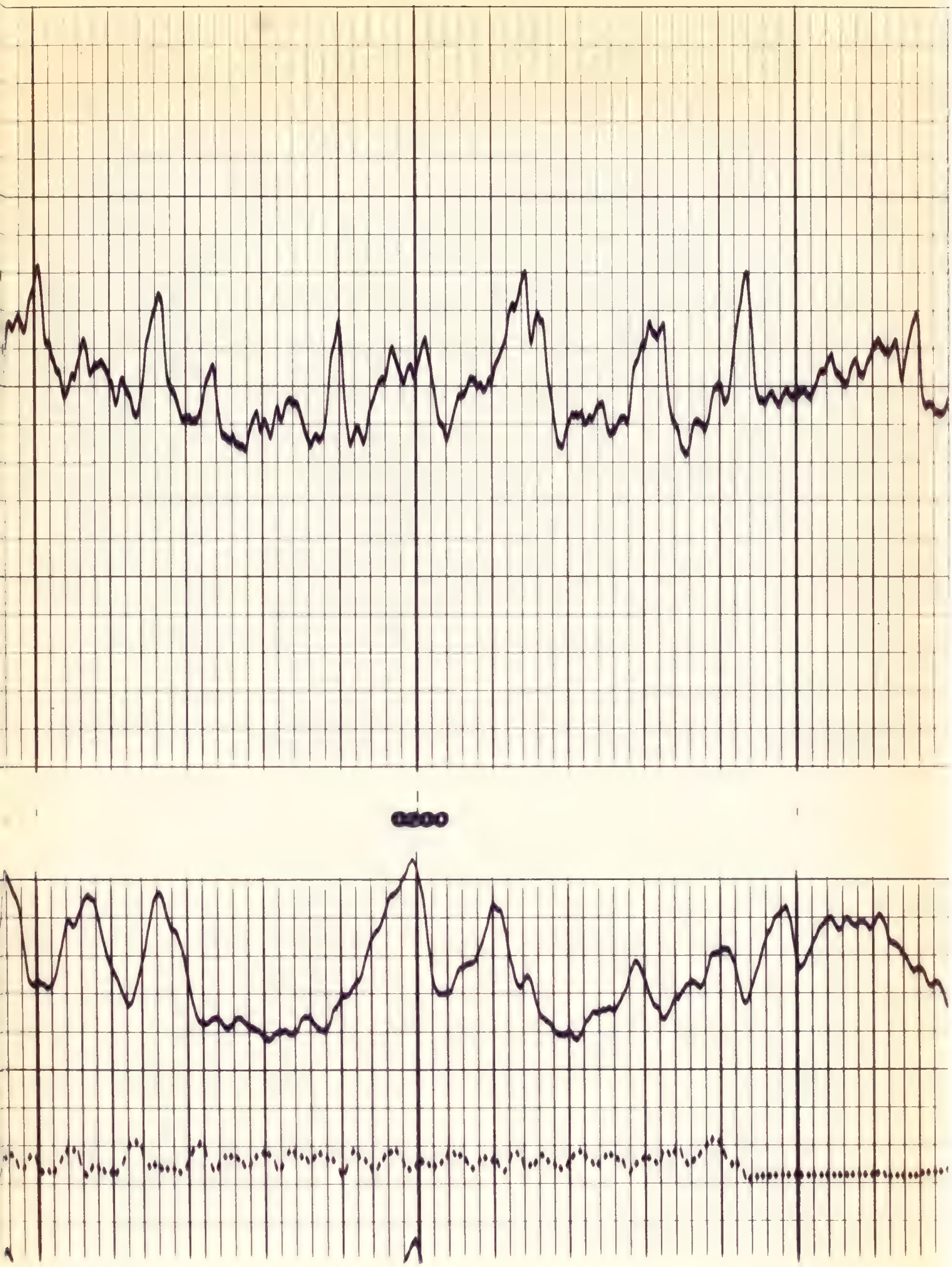
CALIBRATION DATA

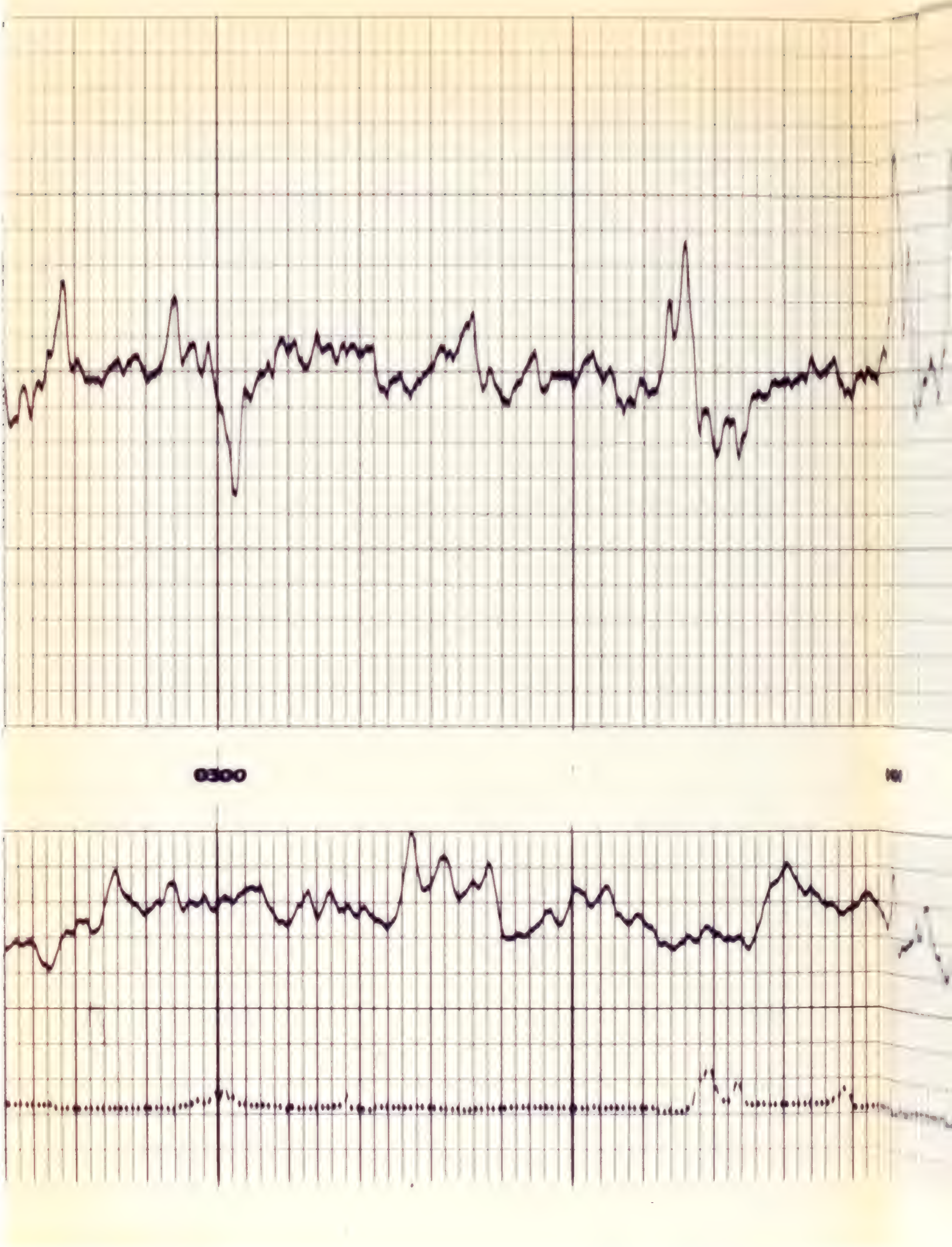
Run No.	Gamma Ray			CNL—Before Log—ACPS		CNL—After Log—ACPS	
	API Scale	Background CPS	Total CPS	Long Spacing	Short Spacing	Long Spacing	Short Spacing
1	0-200	140	560	119	273	119	273
2							
3							
4							
				FDC — Before Log — ACPS		FDC — After Log — ACPS	
1				P_1	P_2	P_1	P_2
2				525	720	525	720
3							
4							

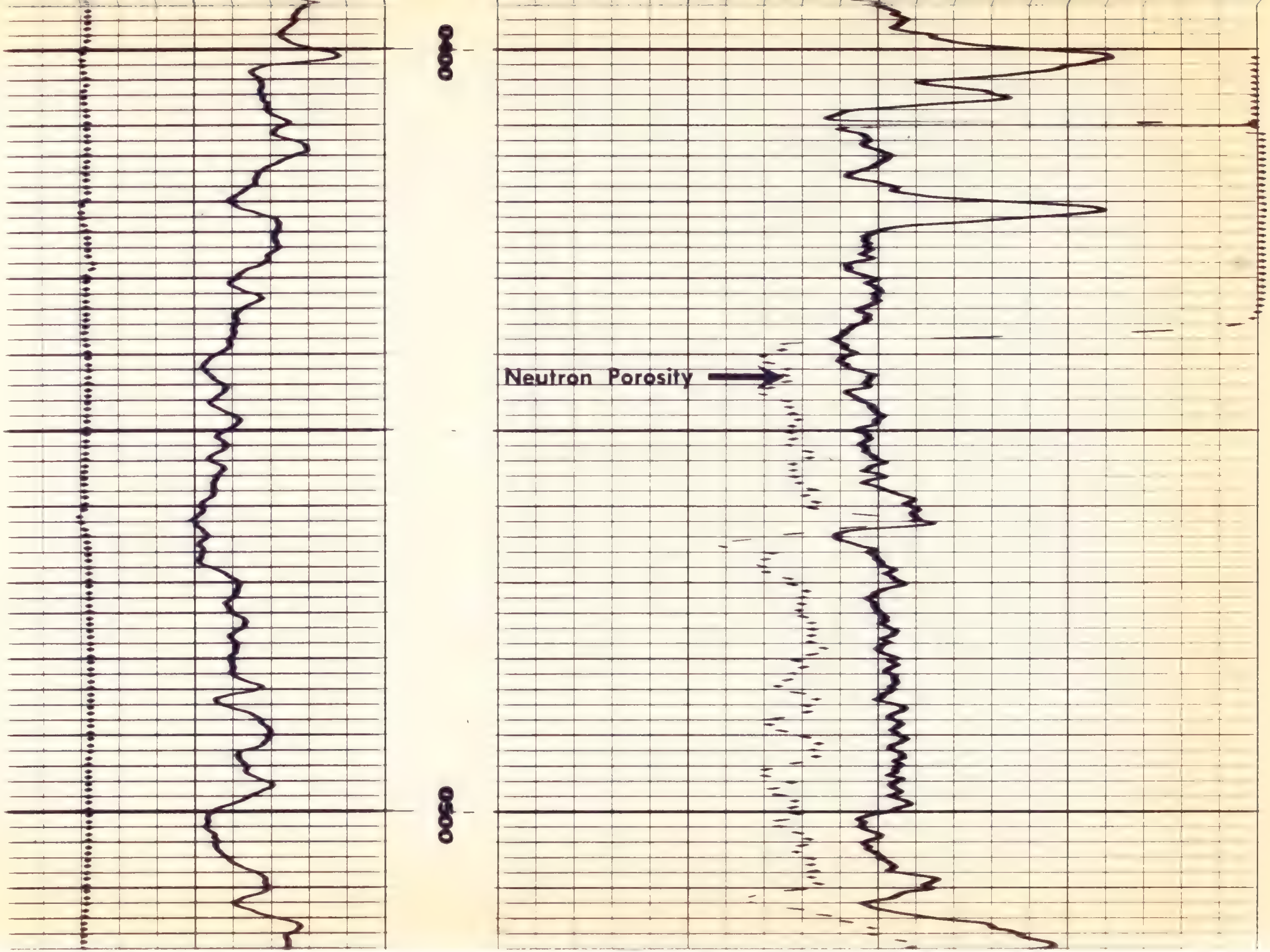
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

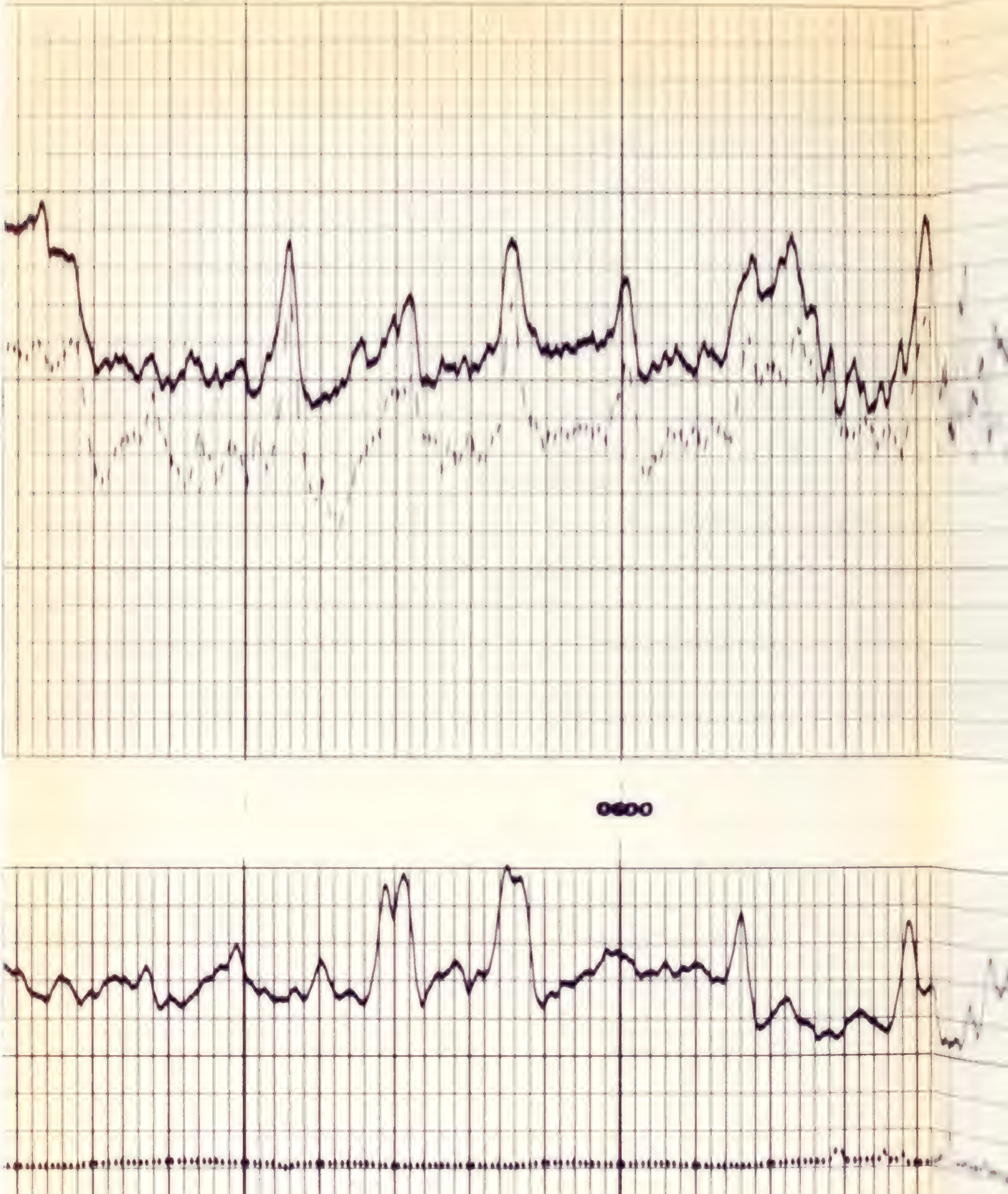


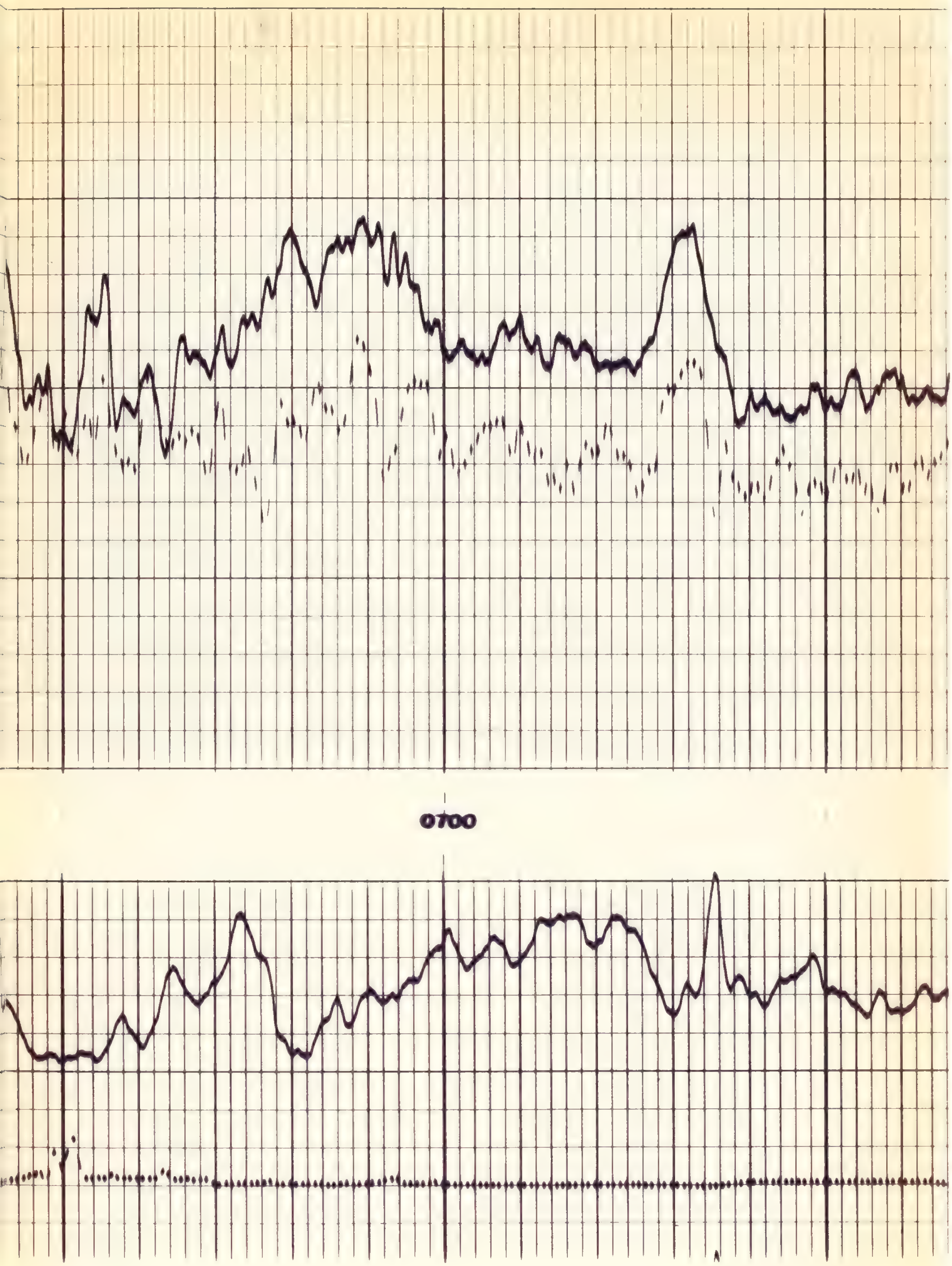

GAMMA RAY
API UNITS
6
16
CALIPER
HOLE DIAM. IN INCHES
DEPTHS
LIMESTONE MATRIX
60
45
30
15
0
DENSITY POROSITY INDEX %
LIMESTONE MATRIX
Caliper
GR
Density Porosity

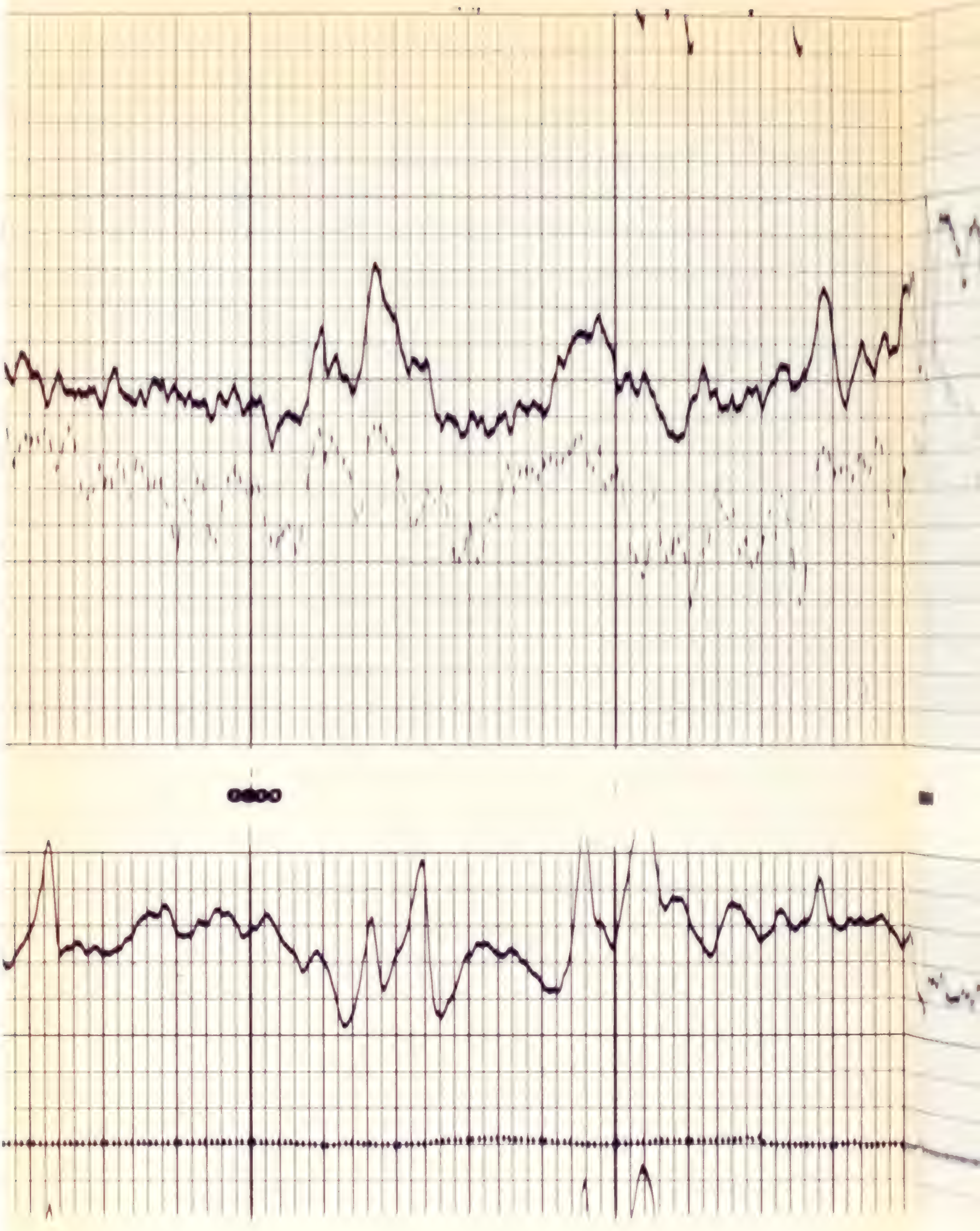


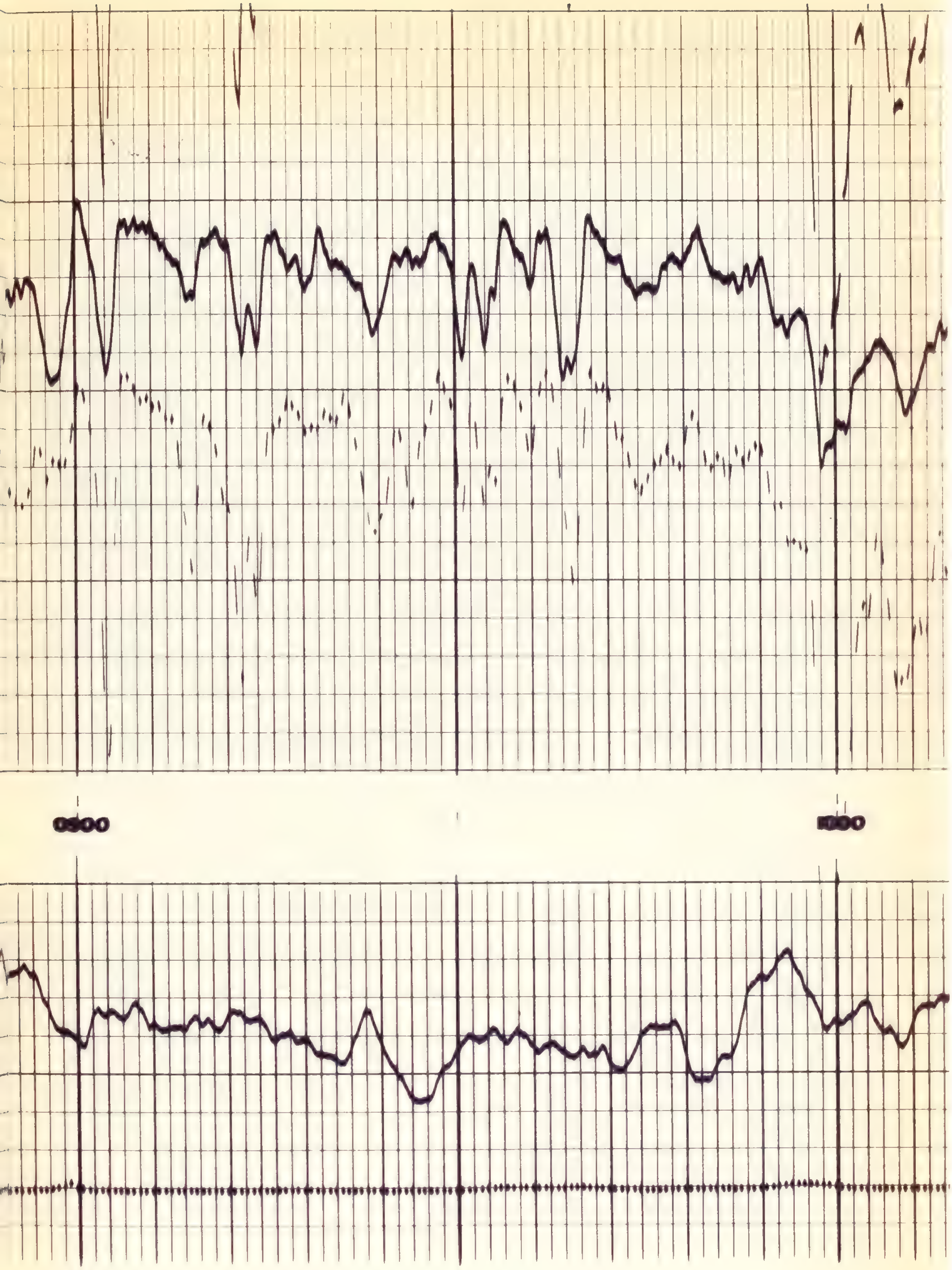

0300

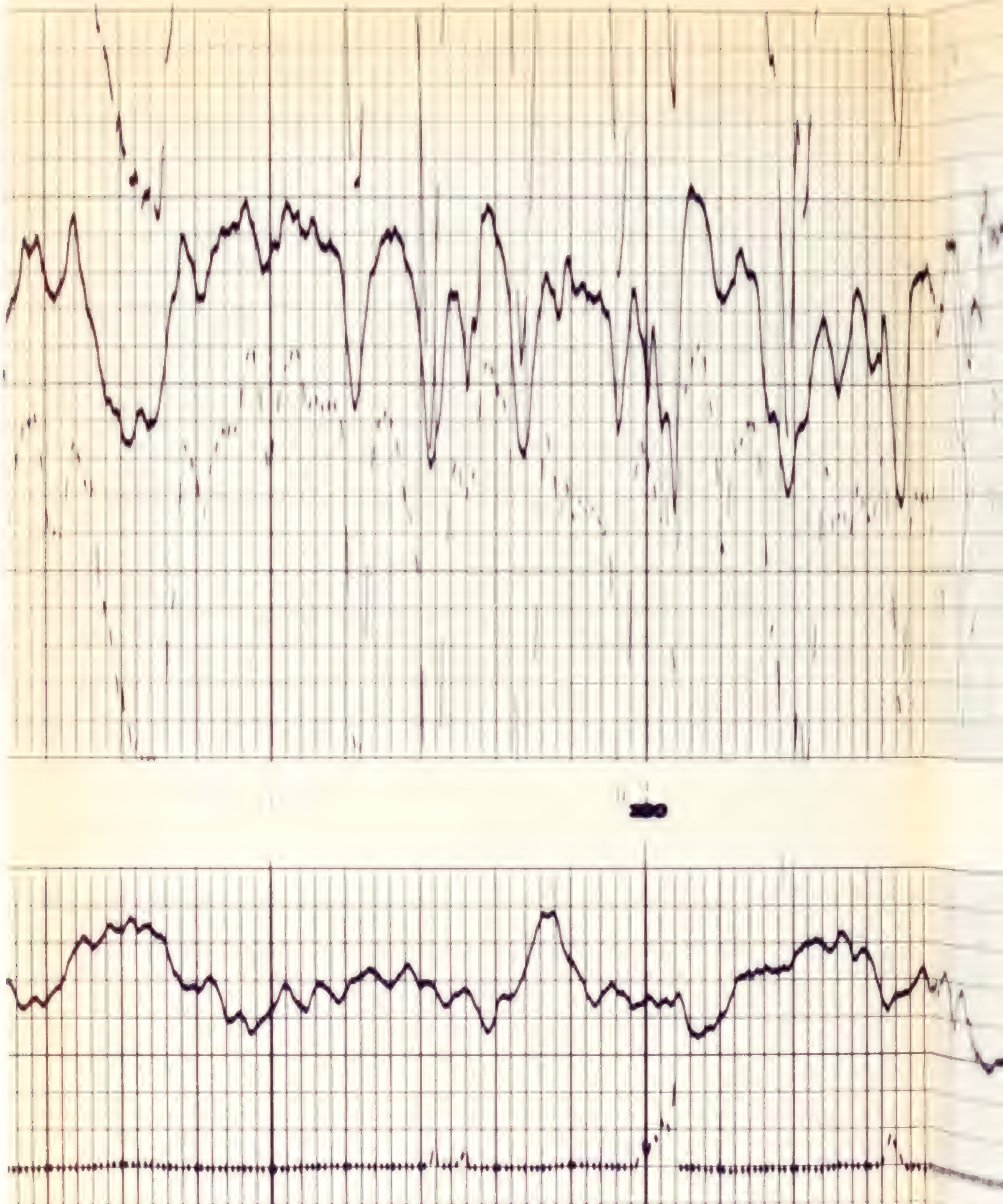

0400
0500
Neutron Porosity

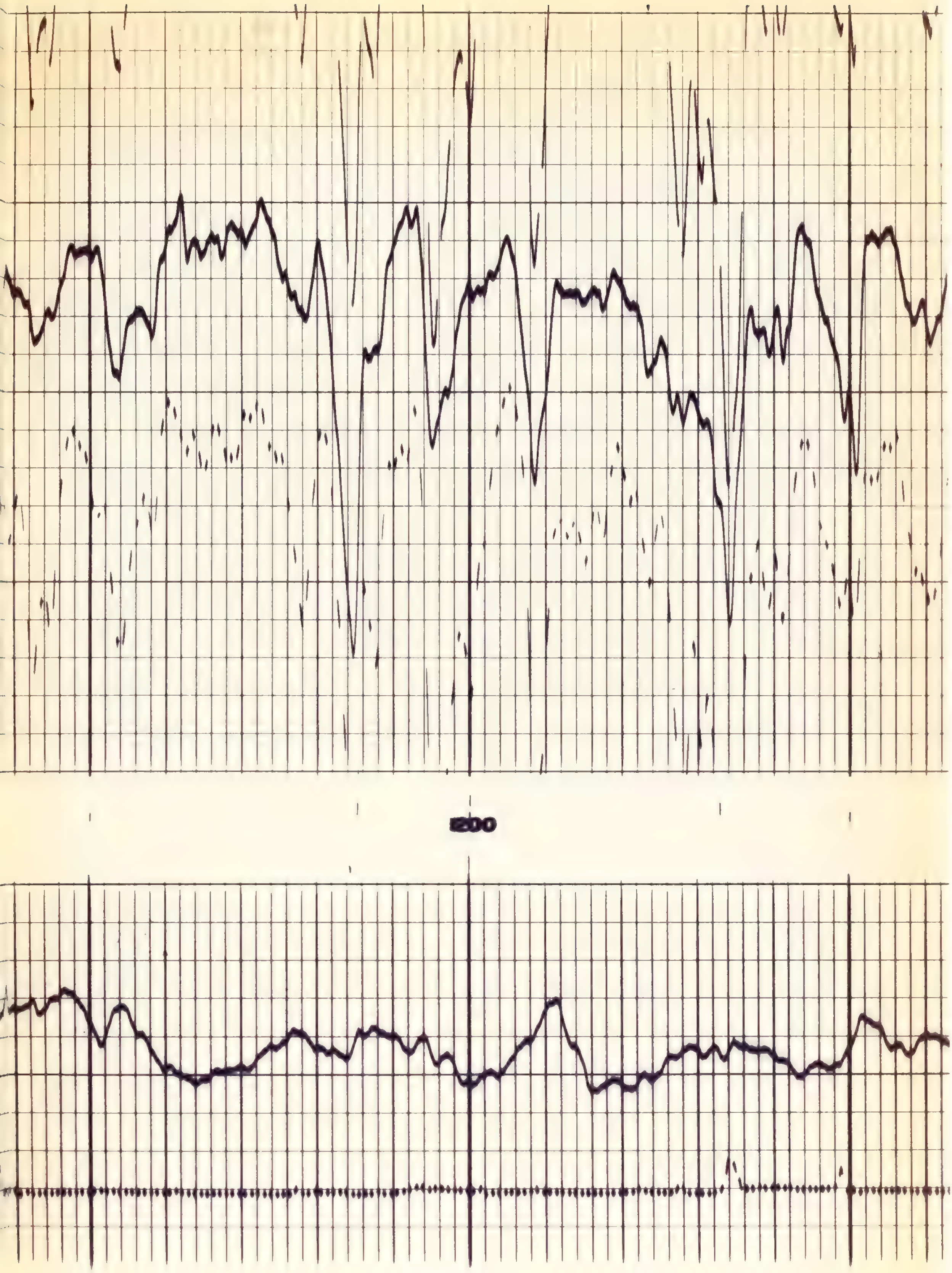


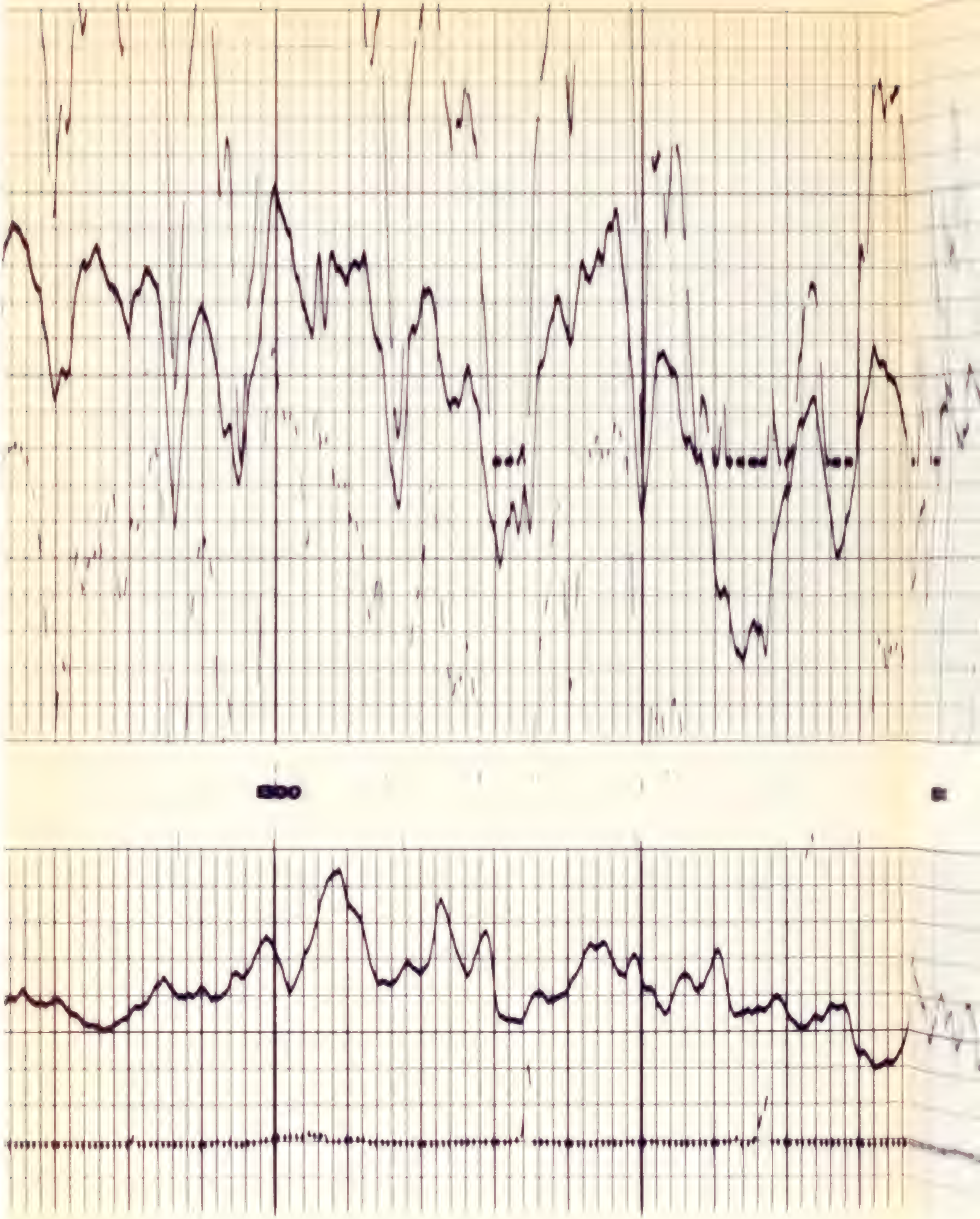

0700

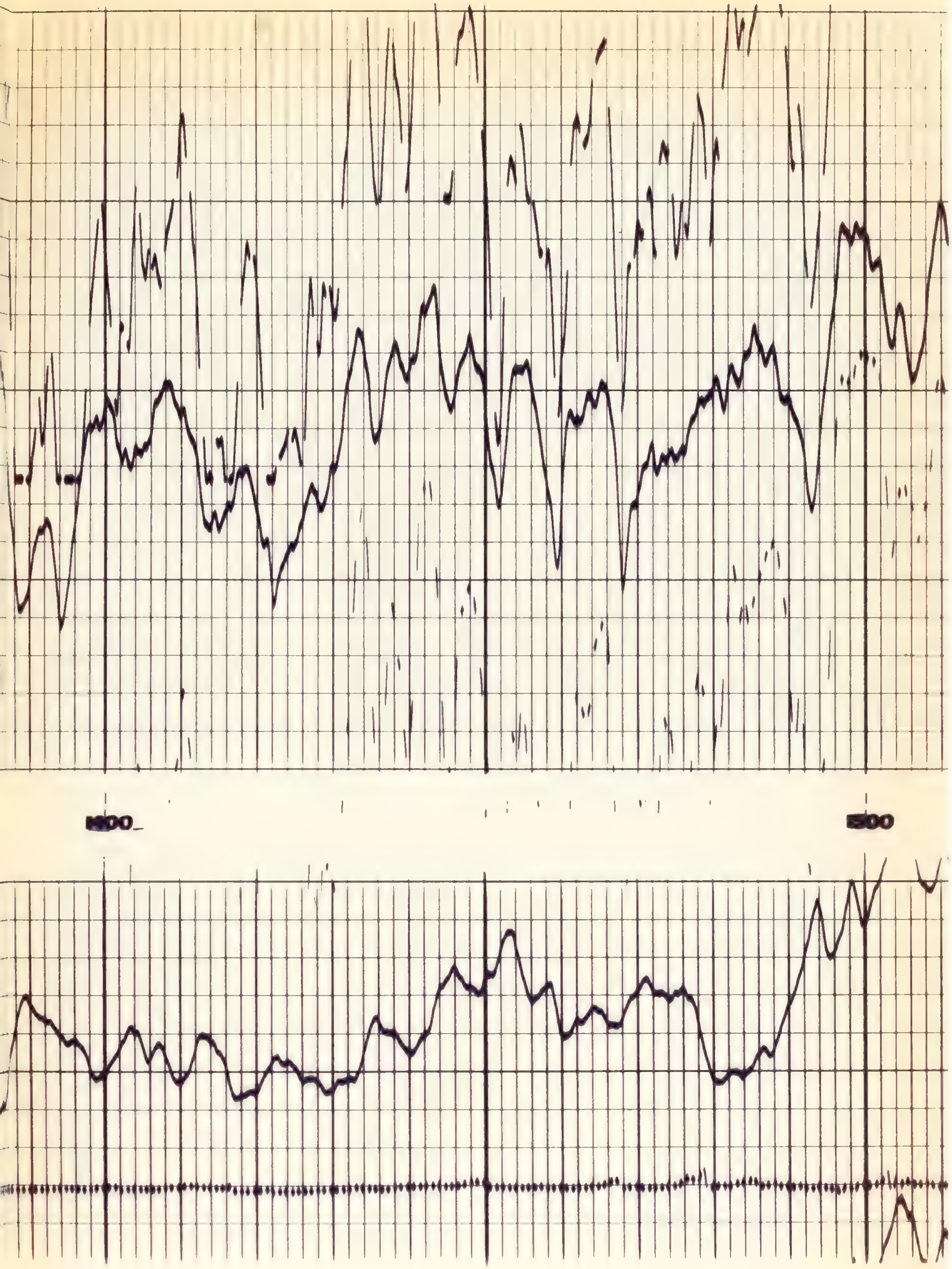


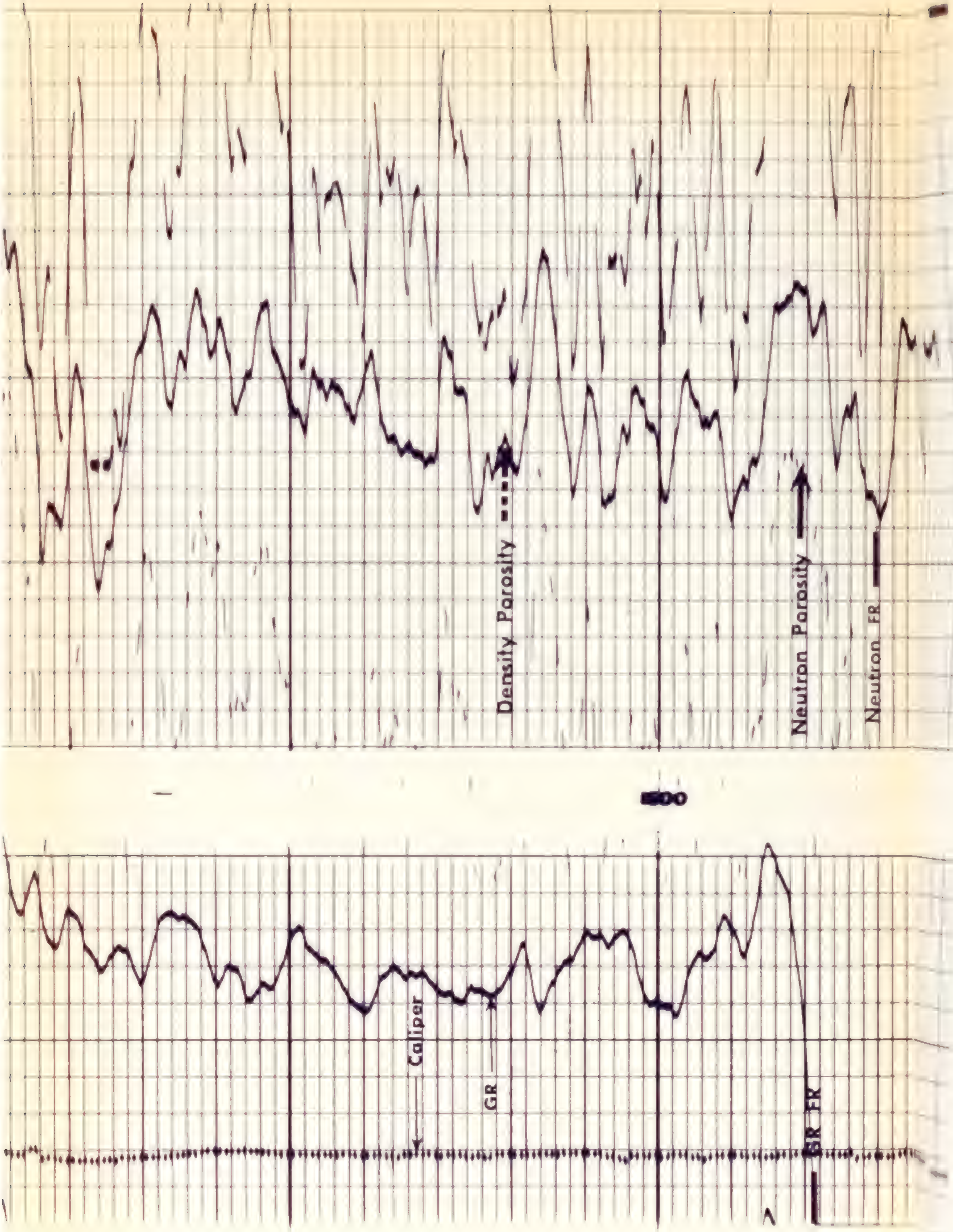

0900
1000

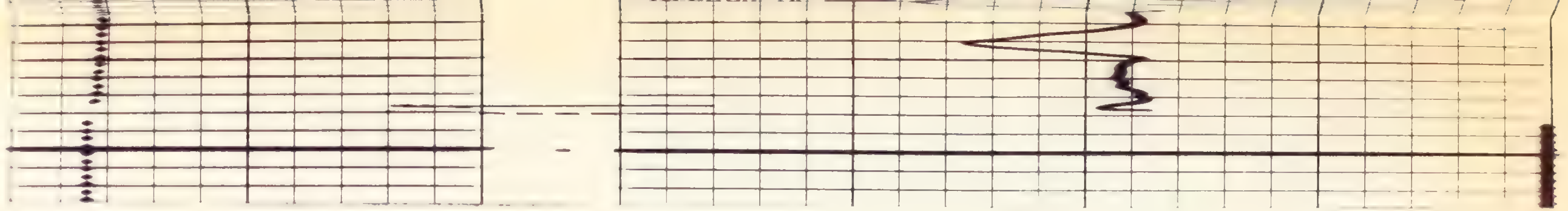


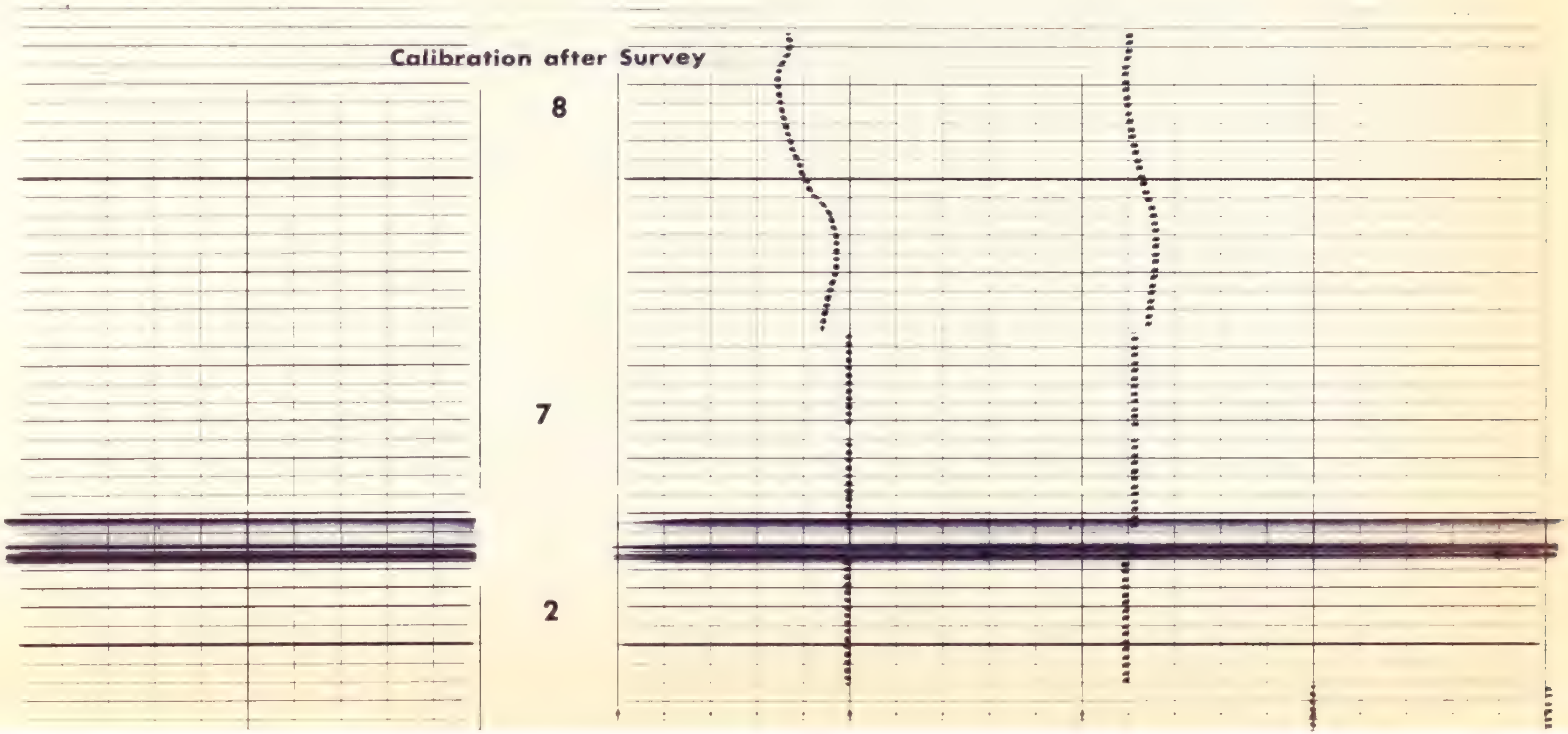

200

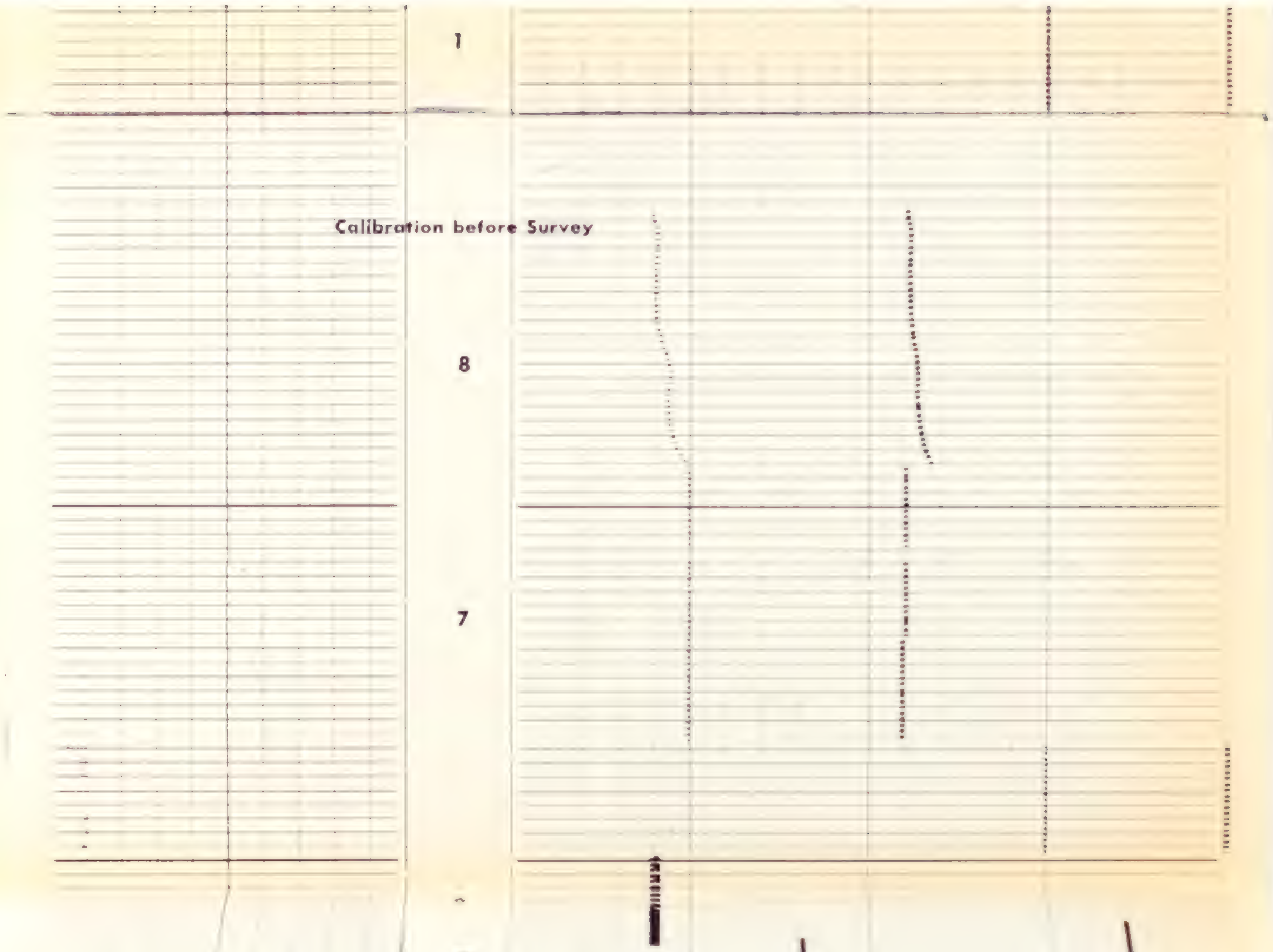

500

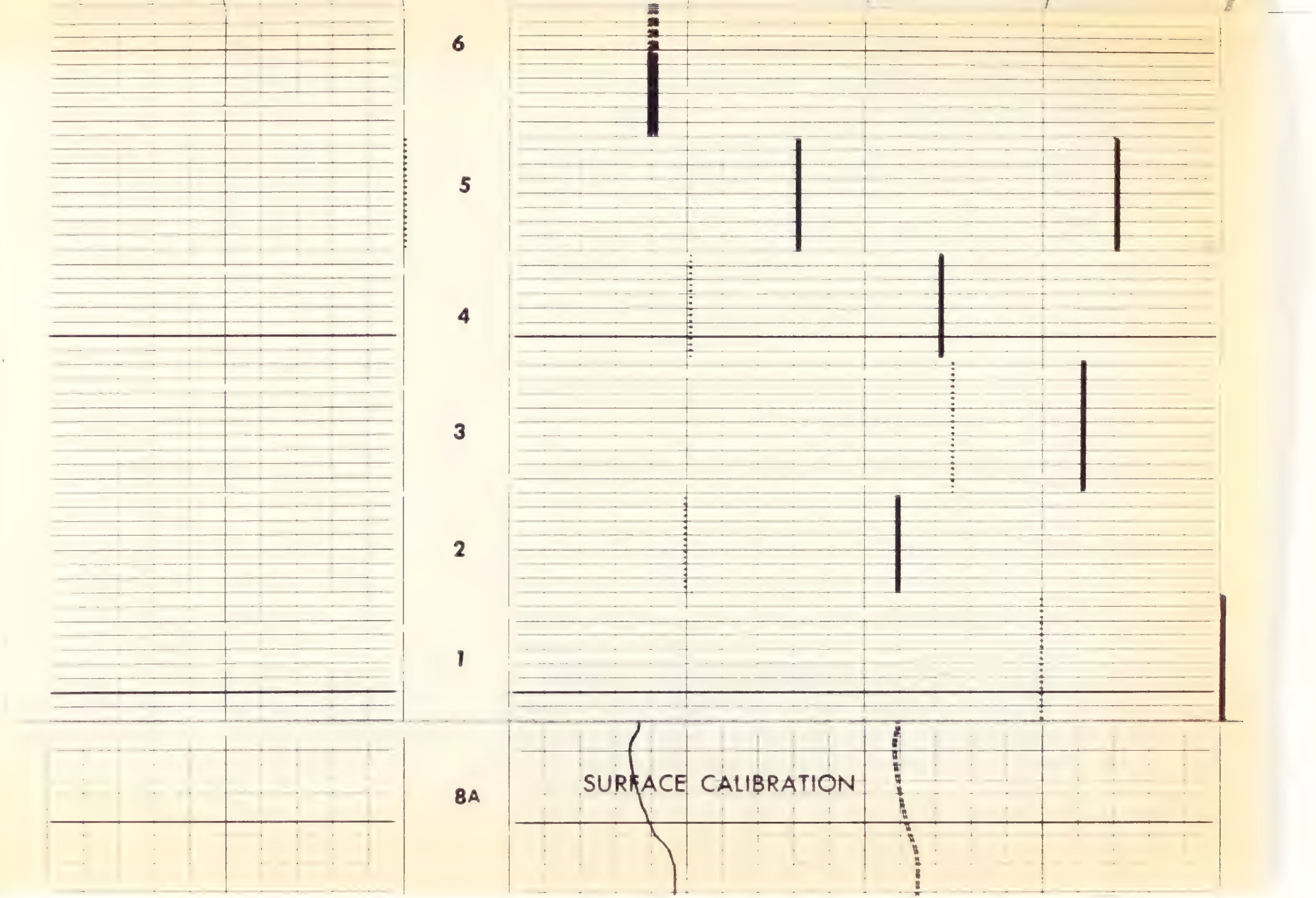

1400
1500

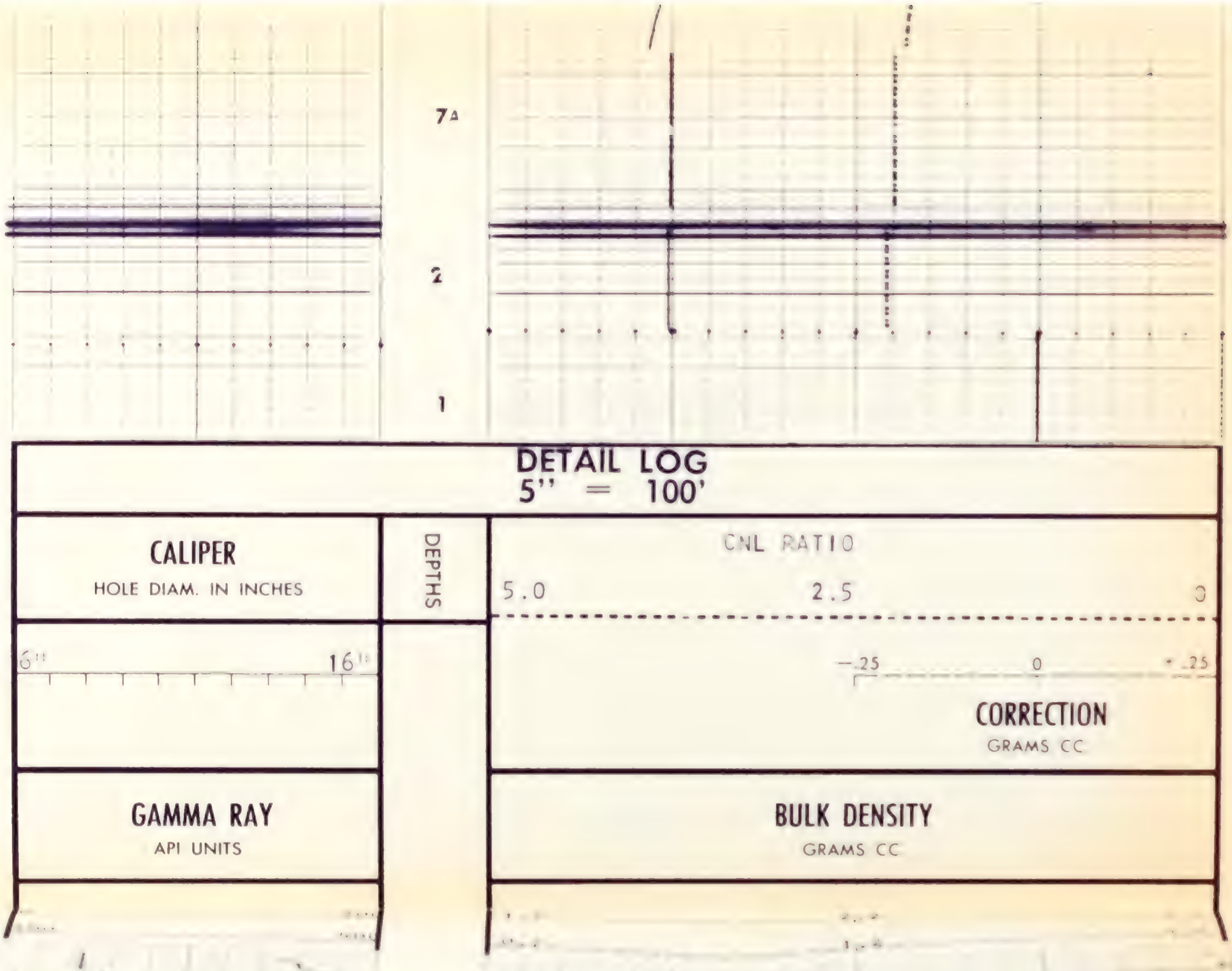

Density Porosity
Neutron Porosity
Neutron FR
Caliper
GR
GR FR

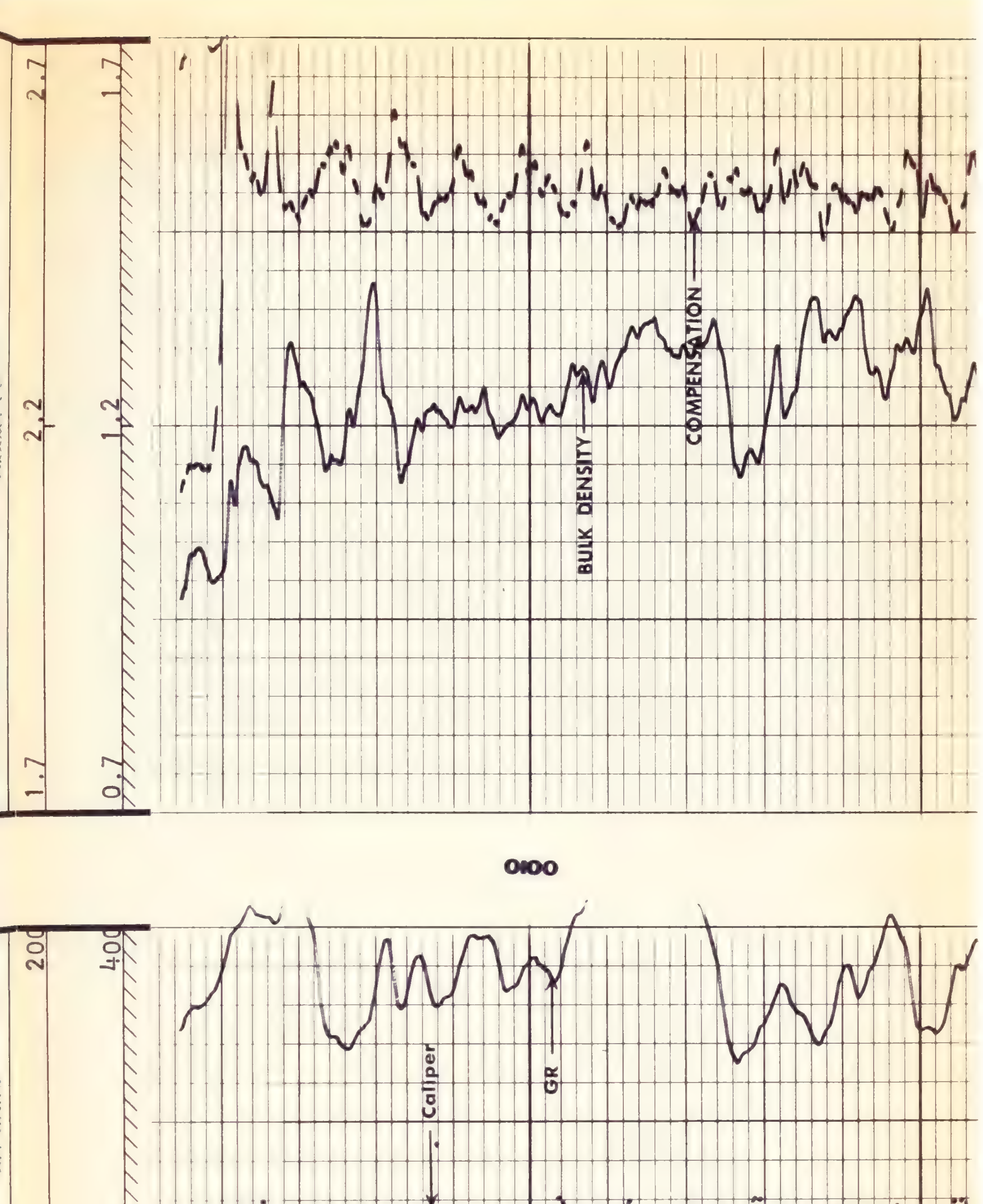


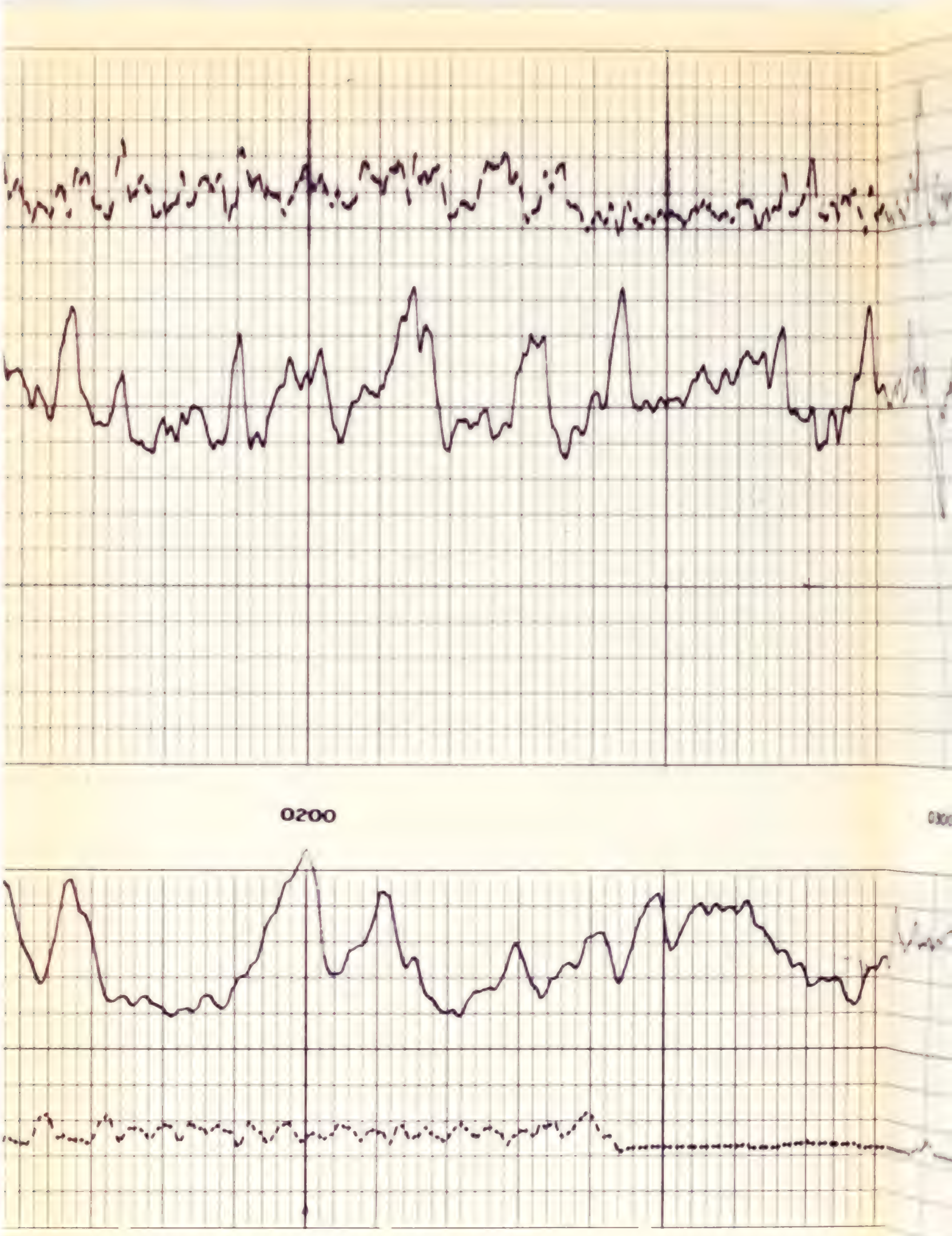

Calibration after Survey
8
7
2

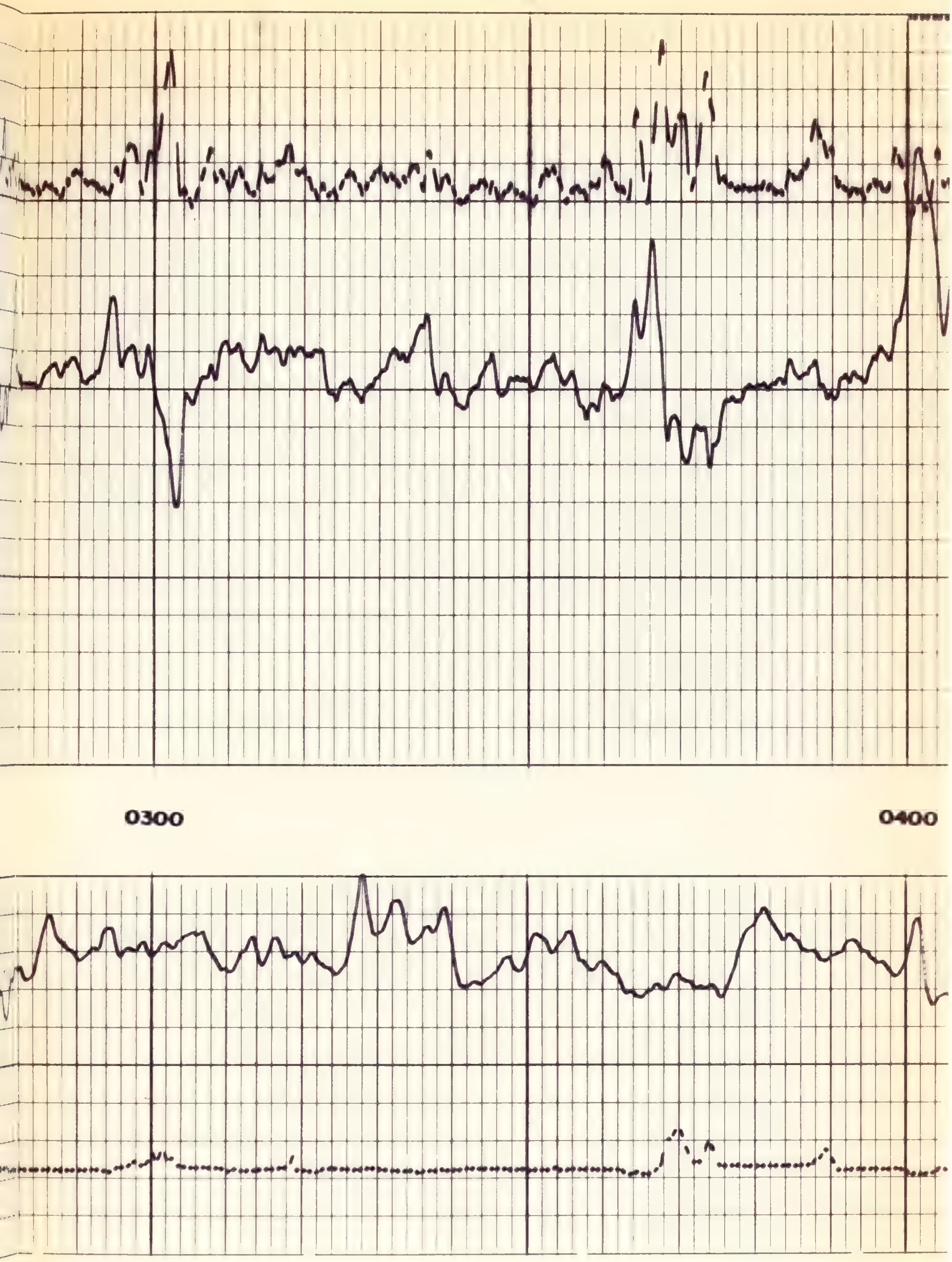

1
Calibration before Survey
8
7

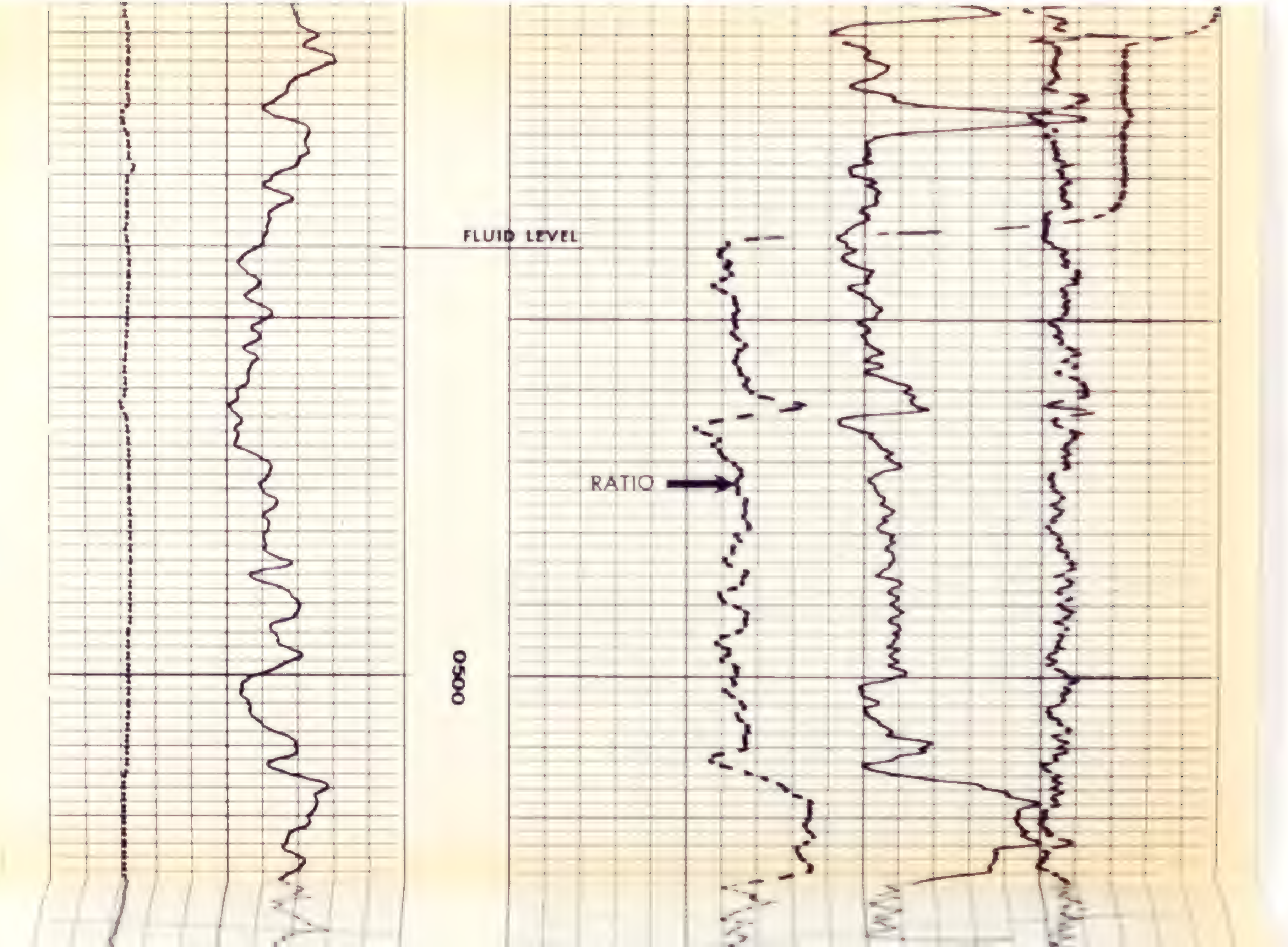

6
5
4
3
2
1
8A
SURFACE CALIBRATION

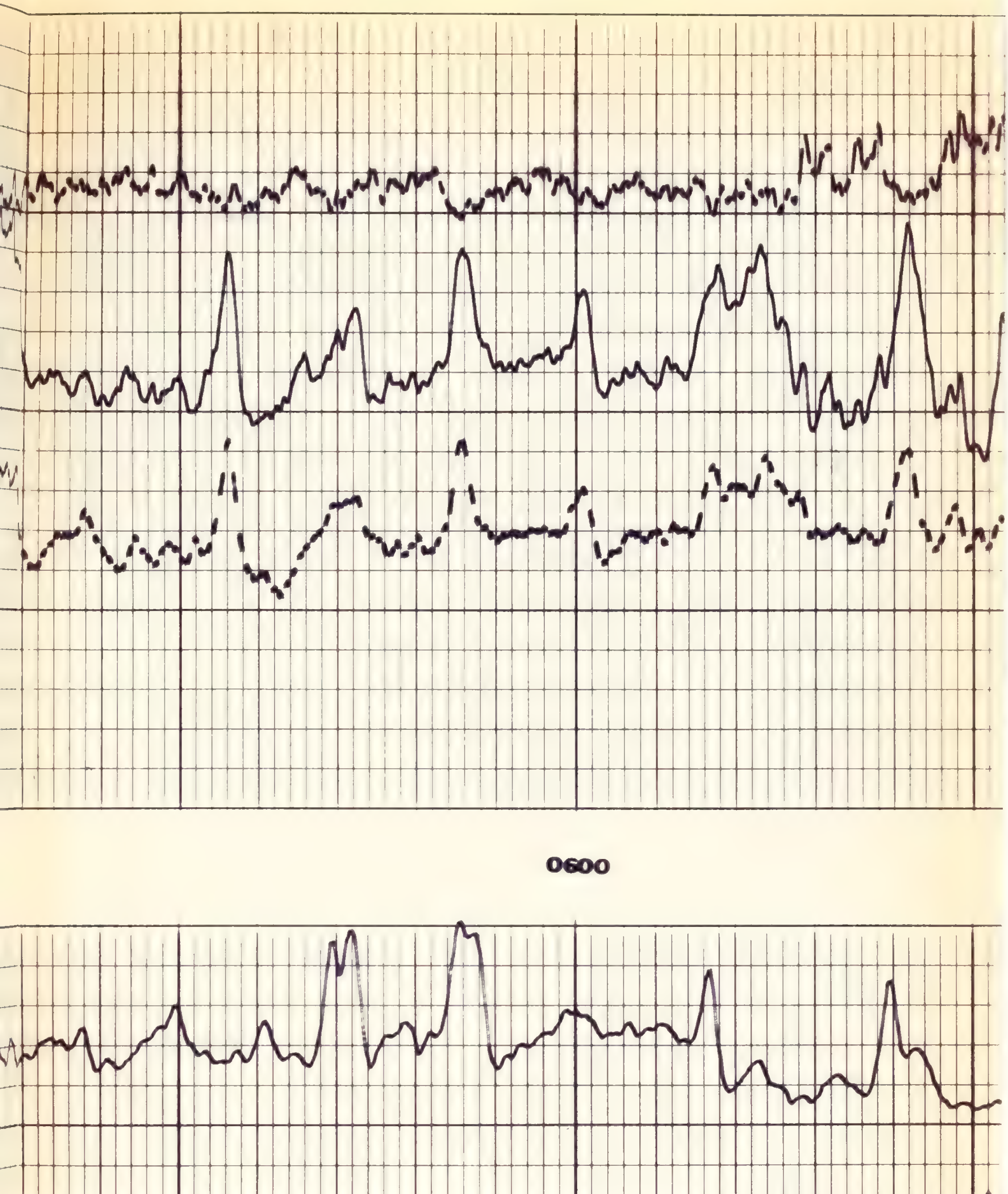

7A
2
1
DETAIL LOG
5'' = 100'
CALIPER
HOLE DIAM. IN INCHES
DEPTHS
CNL RATIO
5.0
2.5
0
6''
16''
-.25
0
+.25
CORRECTION
GRAMS CC
GAMMA RAY
API UNITS
BULK DENSITY
GRAMS CC

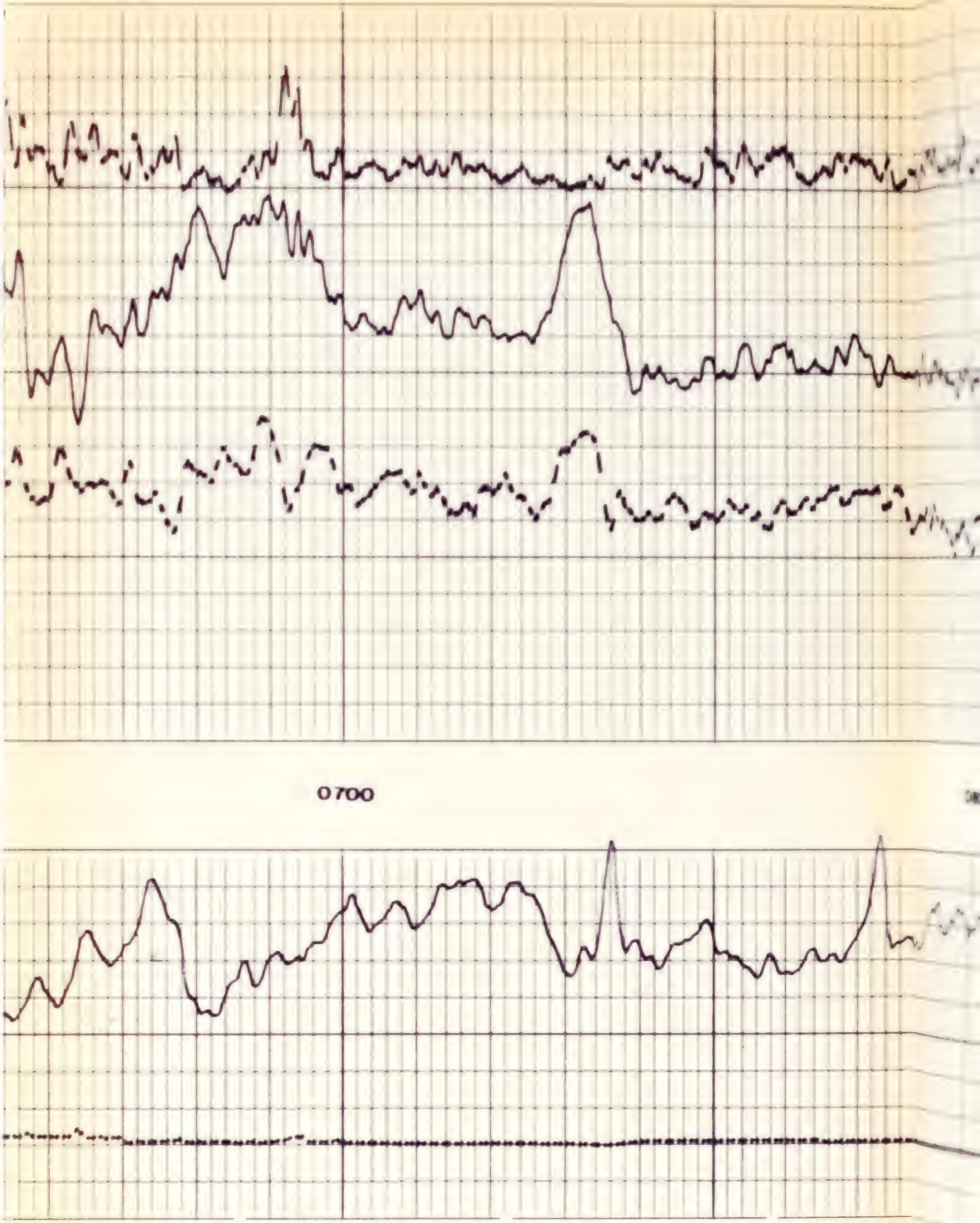

2.7
2.2
1.7
1.7
1.2
0.7
BULK DENSITY
COMPENSATION
0100
200
400
0
200
Caliper
GR

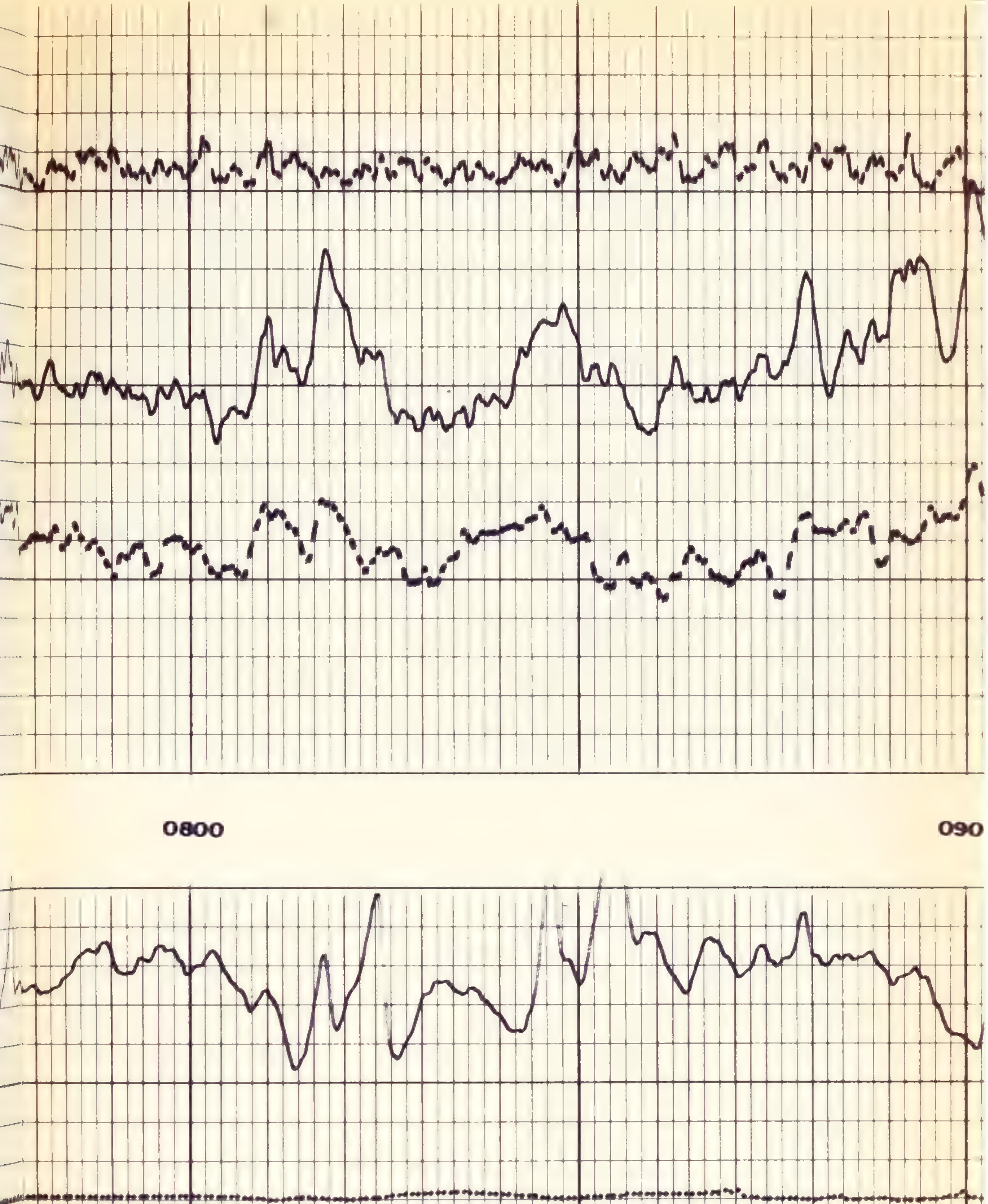

0200
030

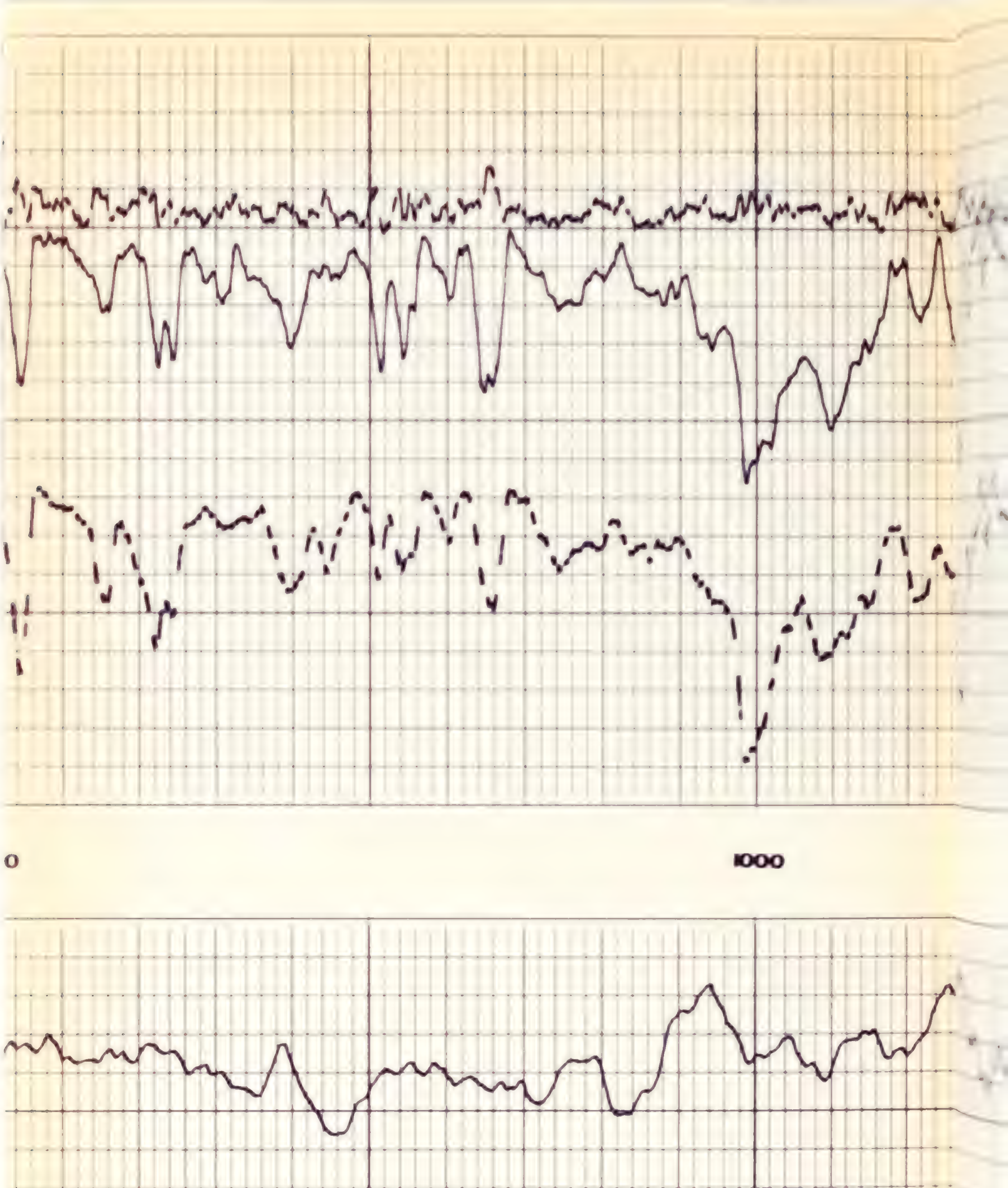

0300
0400

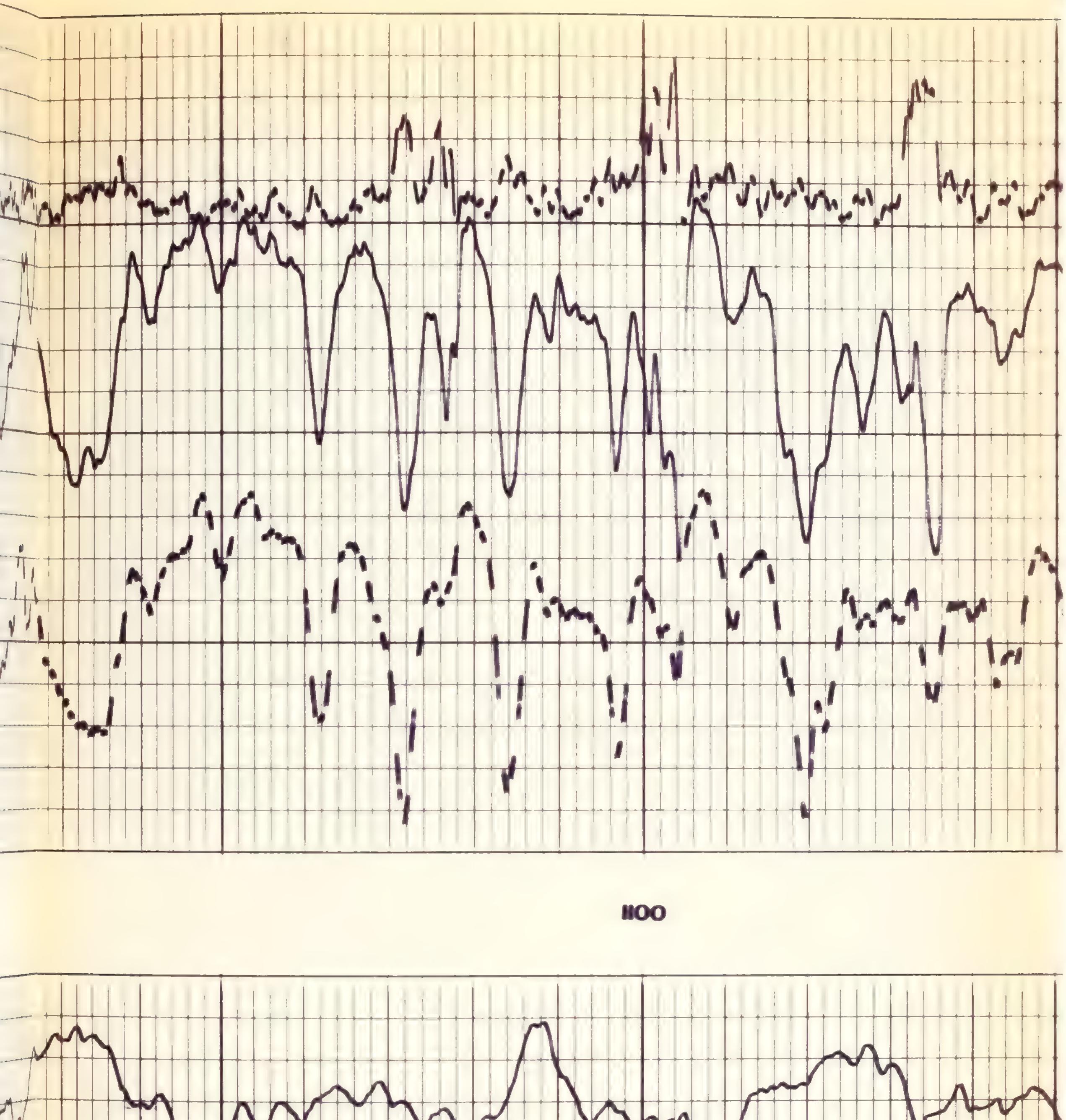

FLUID LEVEL
RATIO
0500

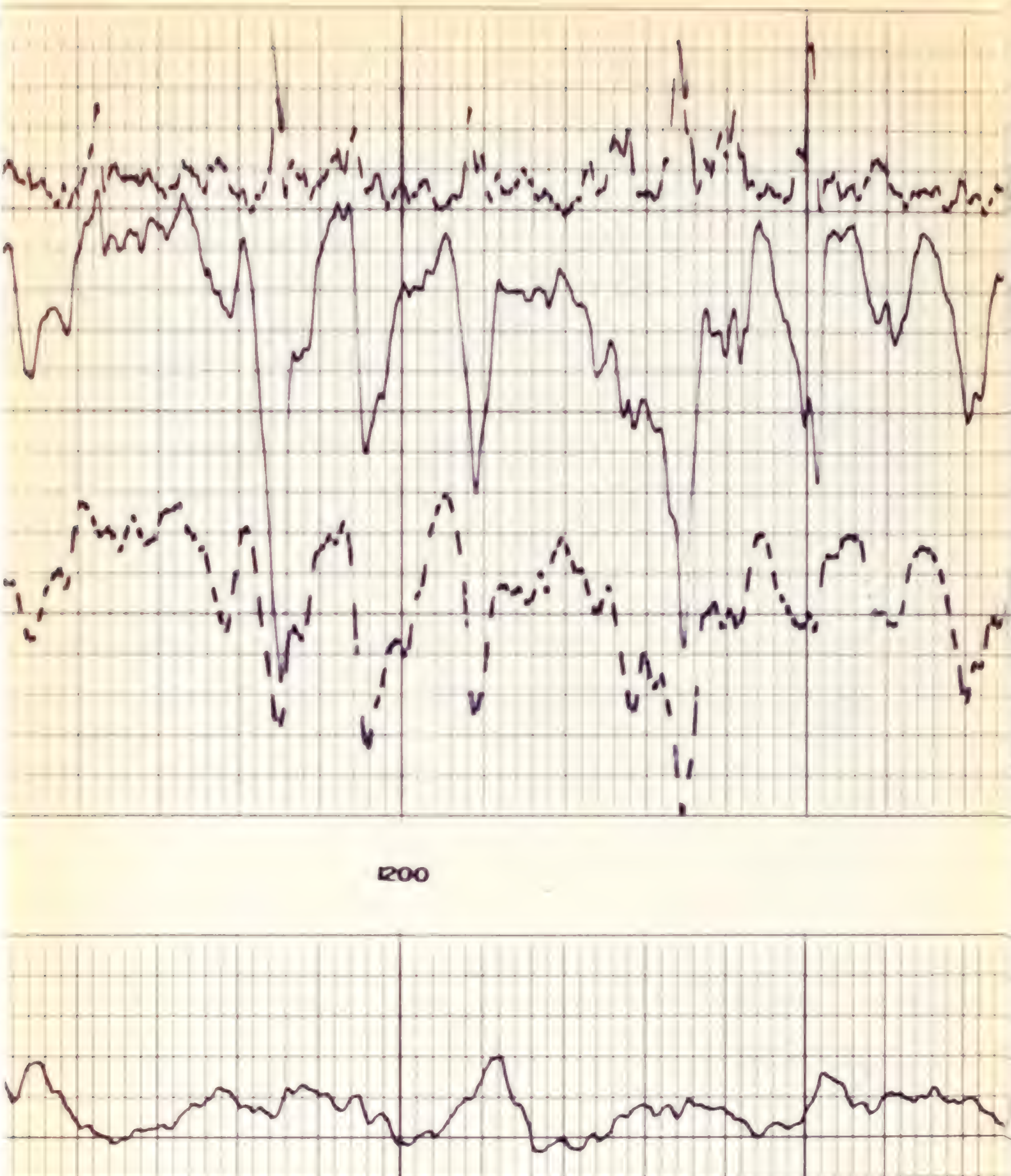

0600

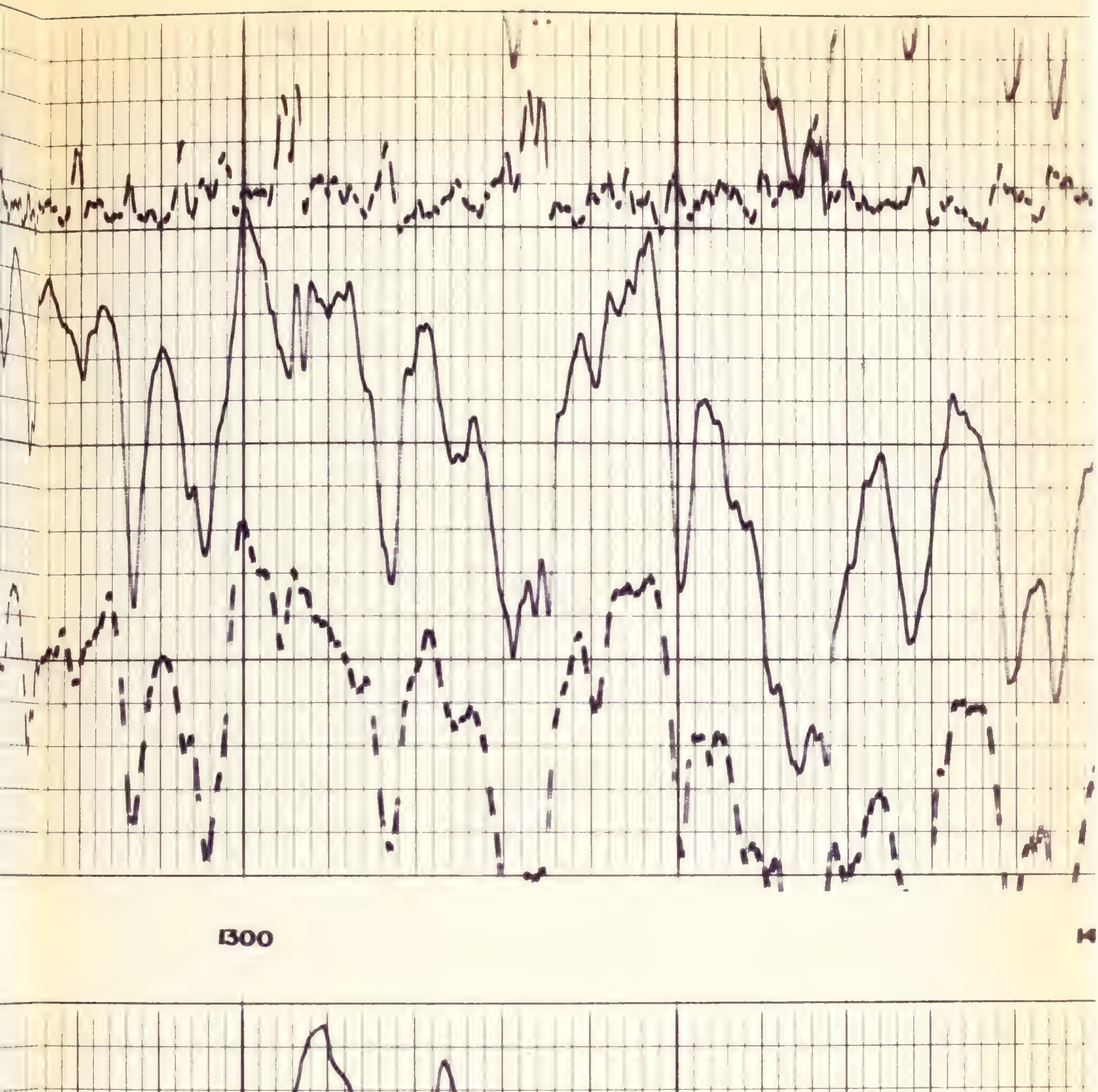

0700

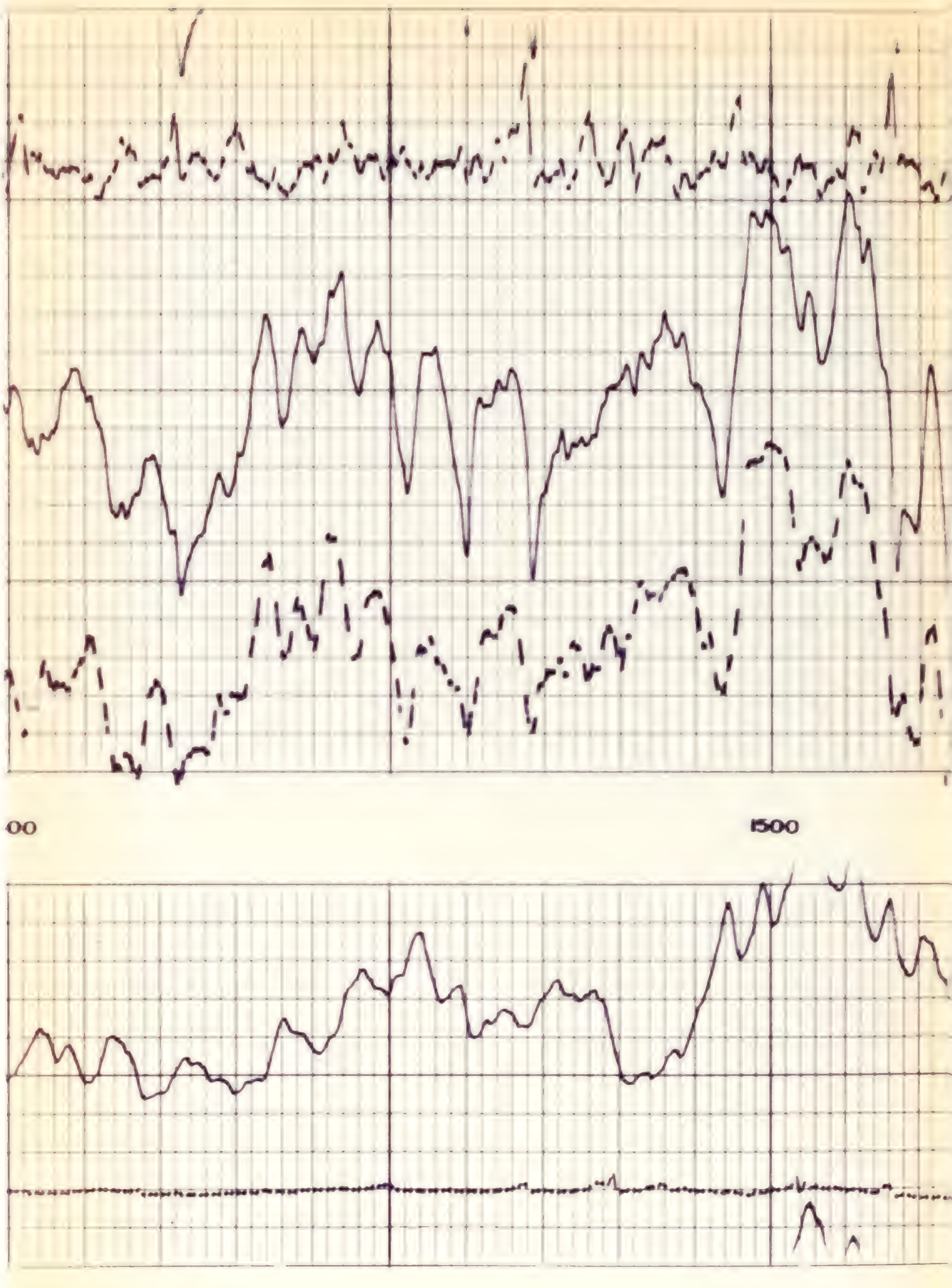

0800
090

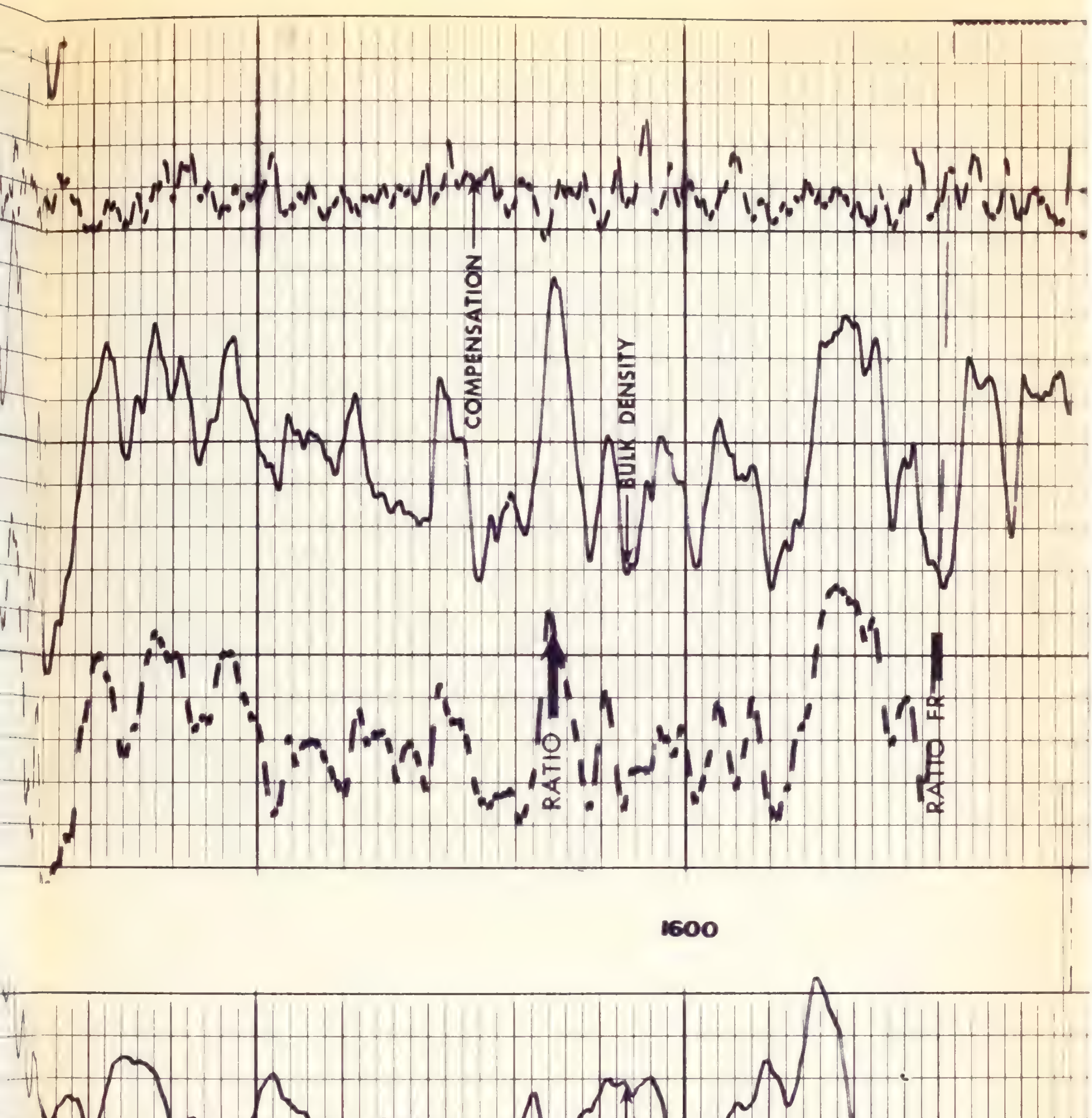

0
1000

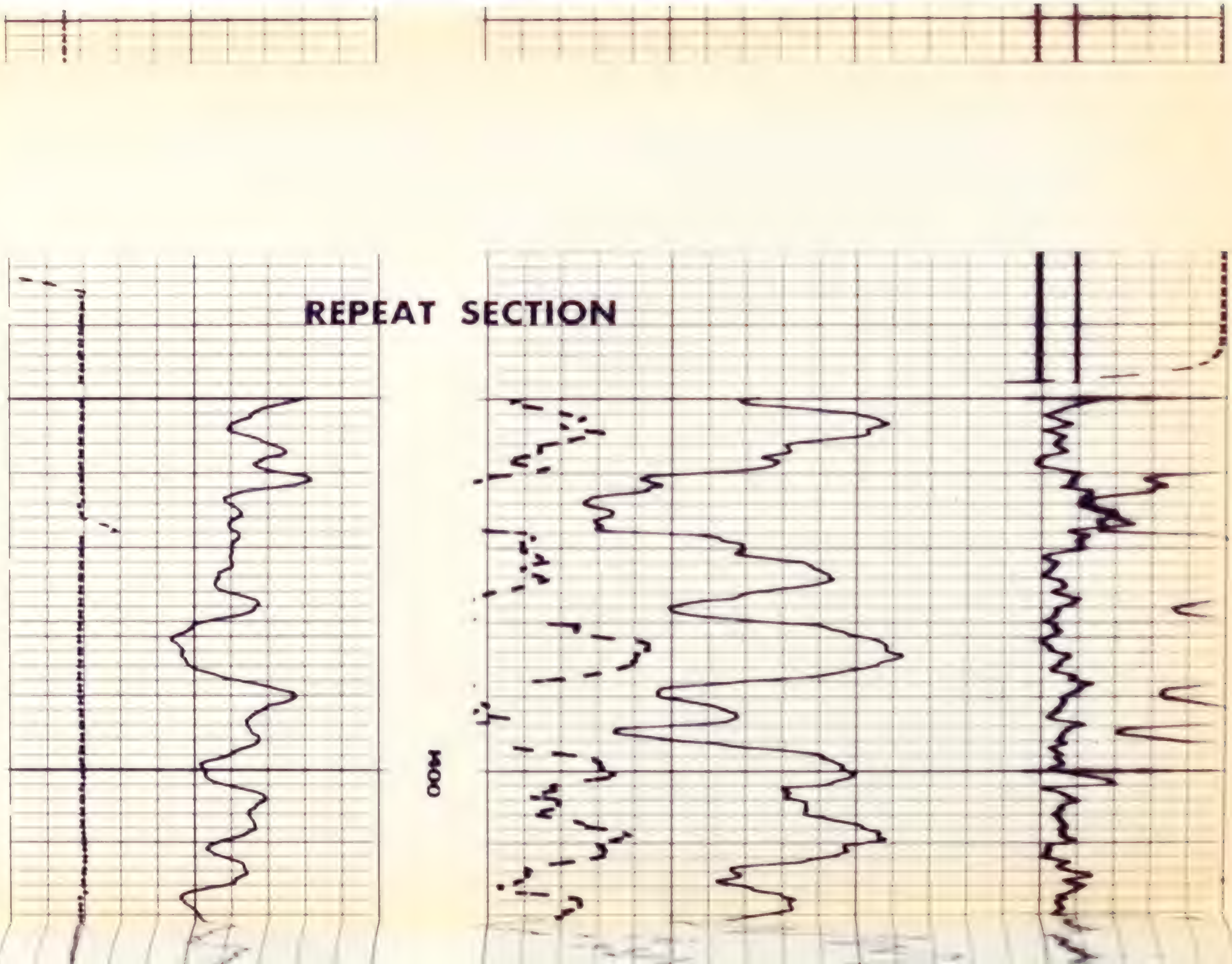

1100

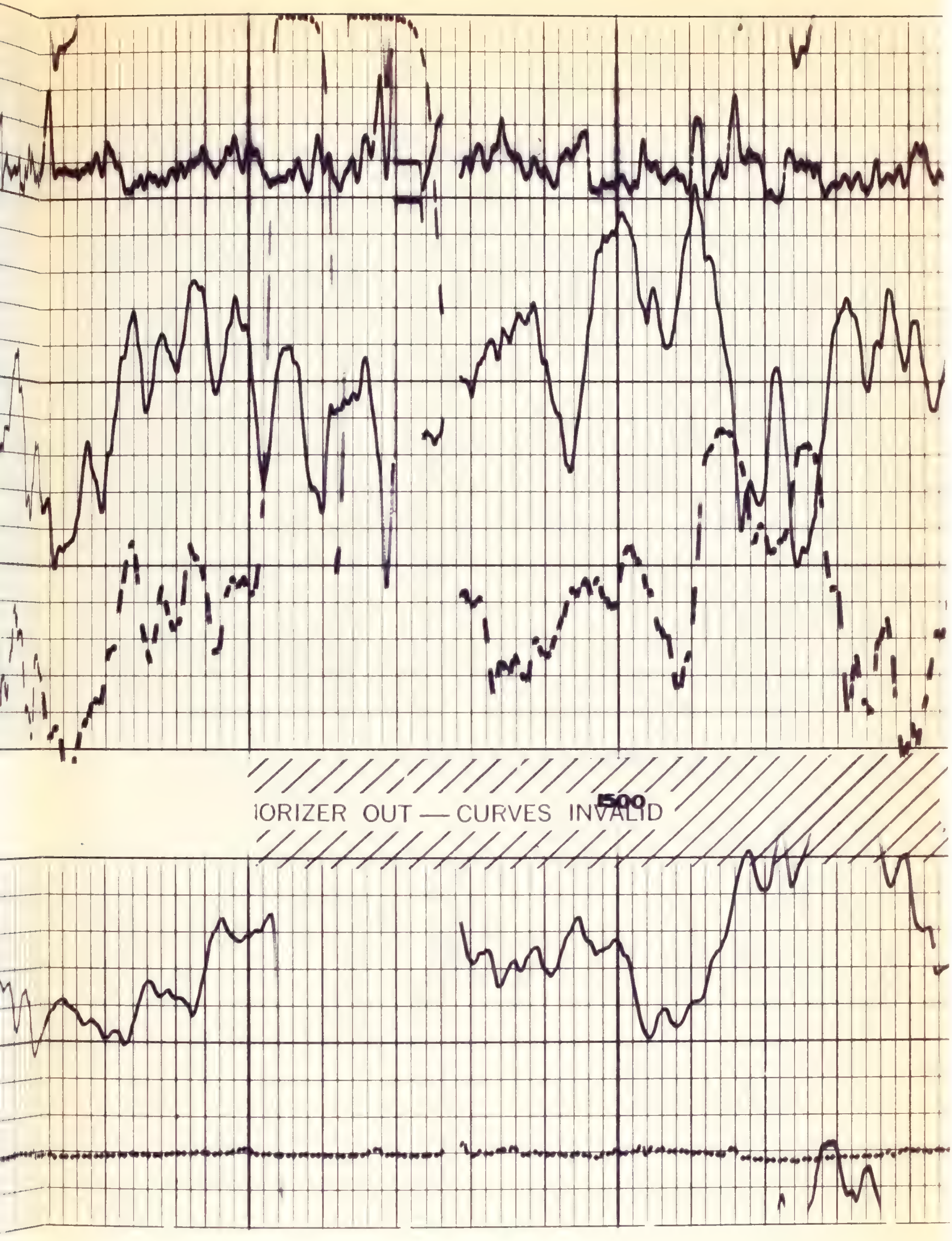

1200

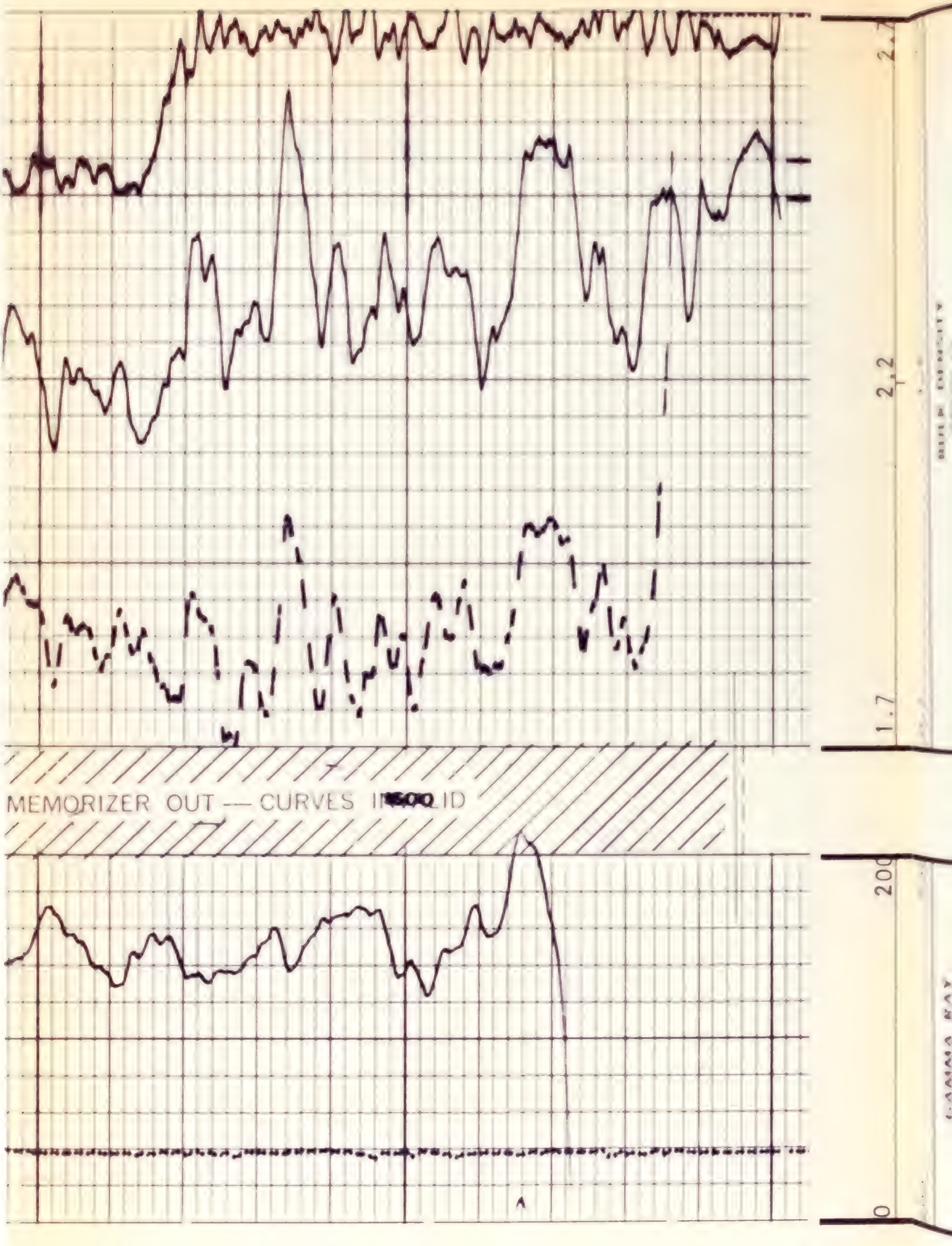

1300
14


00
1500


COMPENSATION
BULK DENSITY
RATIO
RATIO FR
1600
Caliper
GR
GR FR


REPEAT SECTION
1400


1500
ORIZER OUT — CURVES INVALID


MEMORIZER OUT — CURVES I[illegible]ID
2.7
2.2
1.7
200
0

200 400

GAMMA RAY
API UNITS

6" 16"

CALIPER
HOLE DIAM. IN INCHES

DEPTHS

0.7 1.2 1.7

BULK DENSITY
GRAMS/CC.

−.25 0 +.25

CORRECTION
GRAMS/CC.

CNL RATIO
5.0 2.5 0

COMPANY THE ATLANTIC RICHFIELD COMPANY
WELL AQUIFER TEST #1-C
FIELD SORGHAM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1645
SCHL. TD 1645
DRLR TD 1640
Elev:
KB
DF
GL 6909

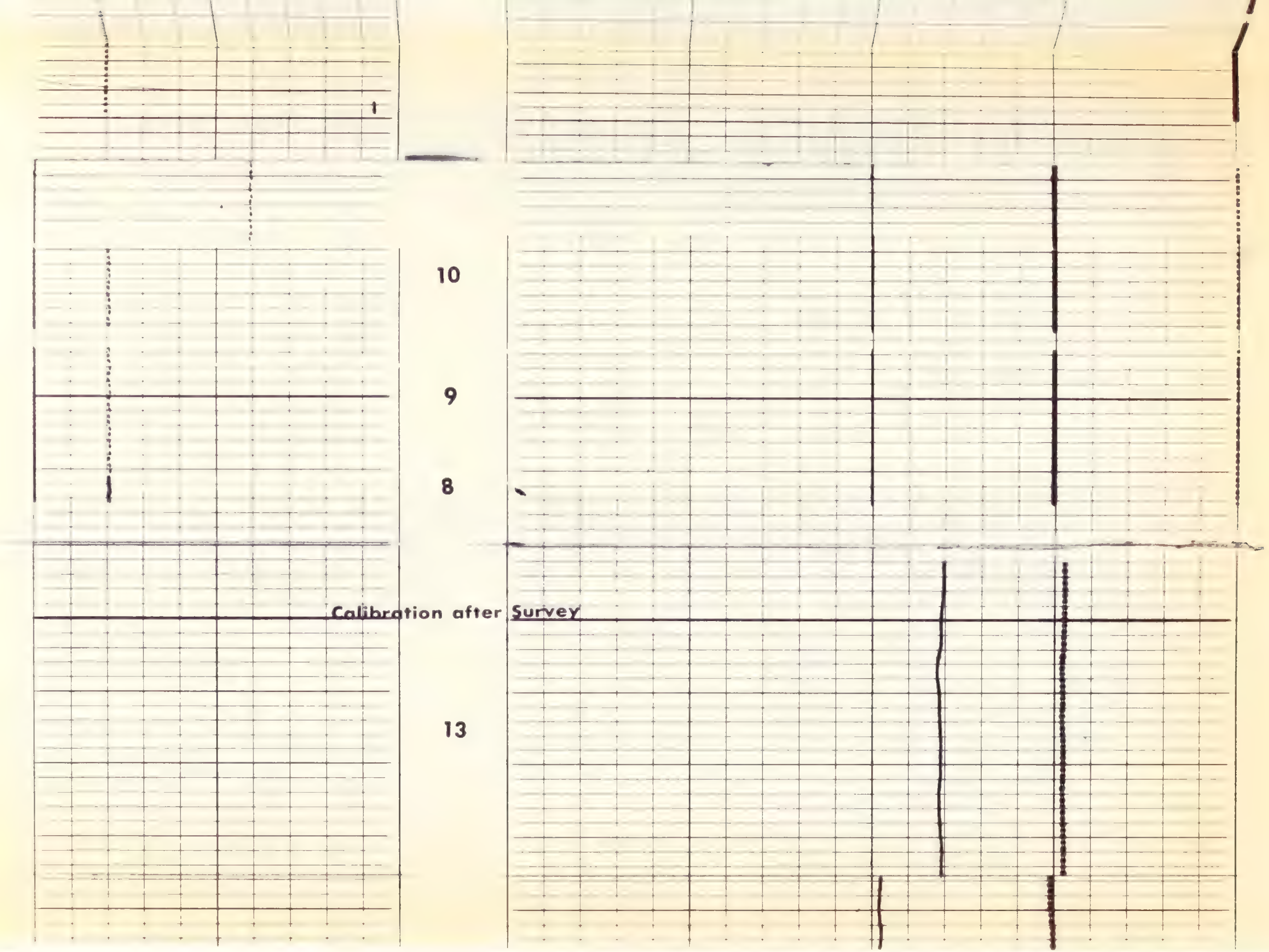
CALIBRATION RECORD

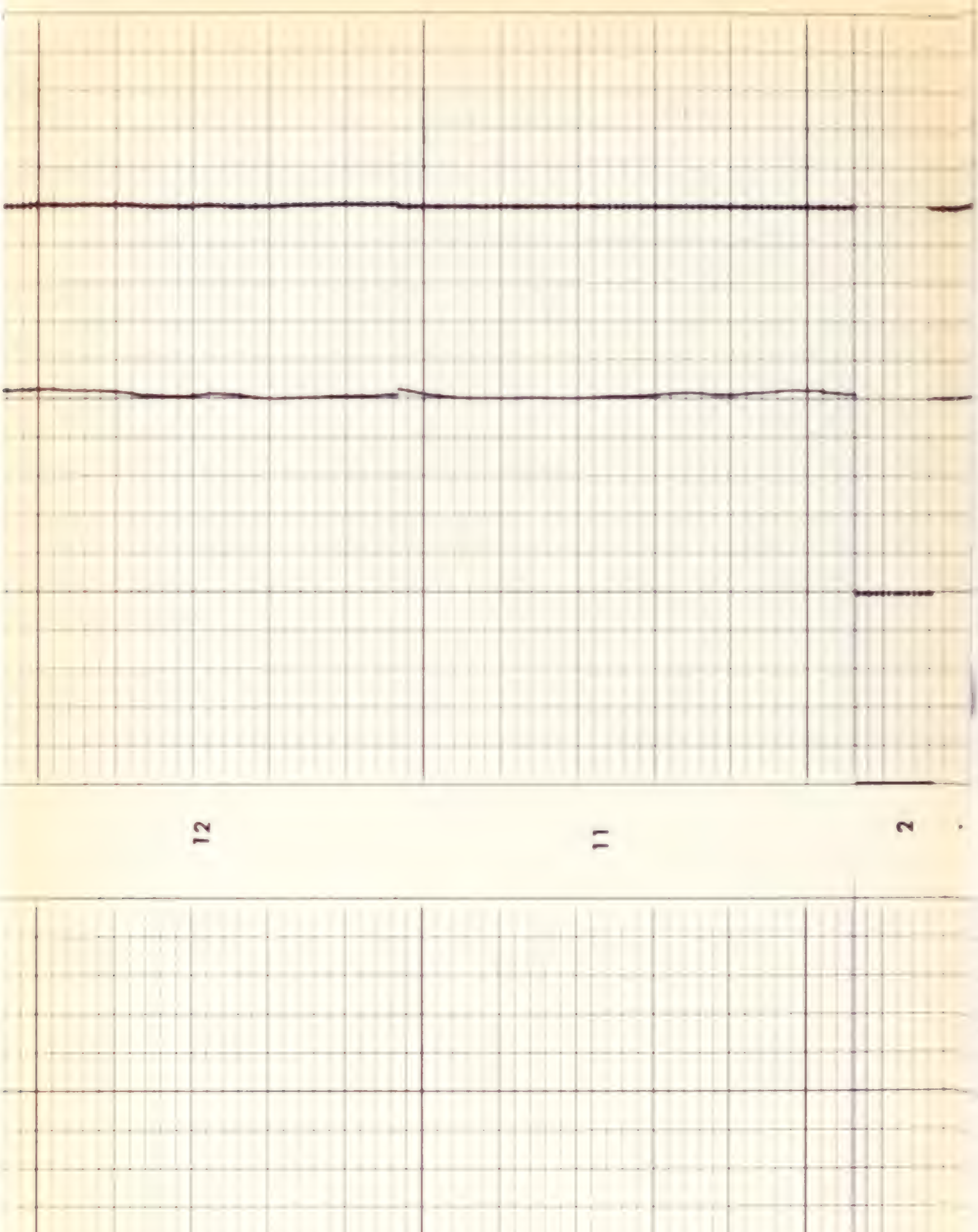
G. R. SURFACE CALIBRATION

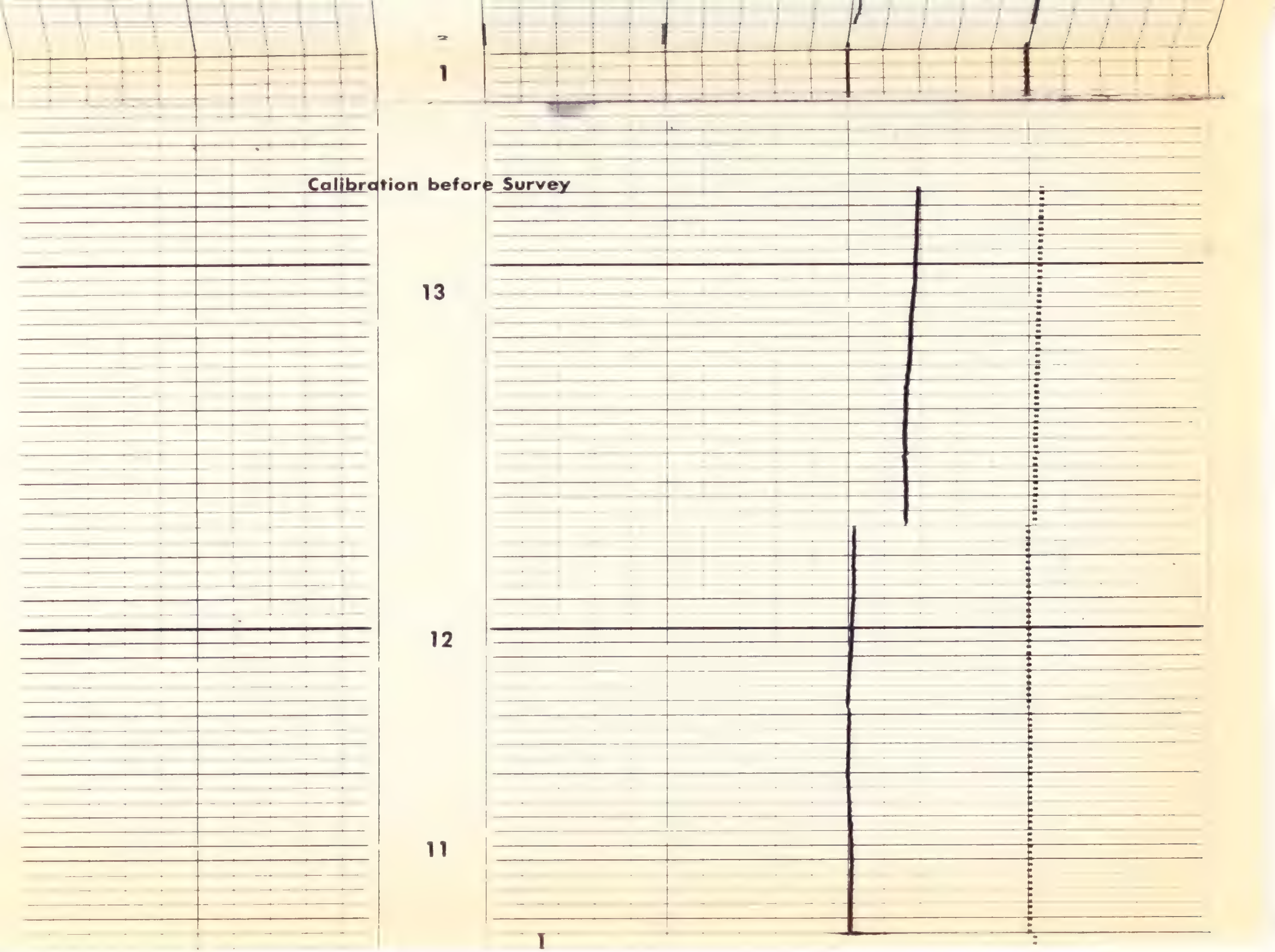
6

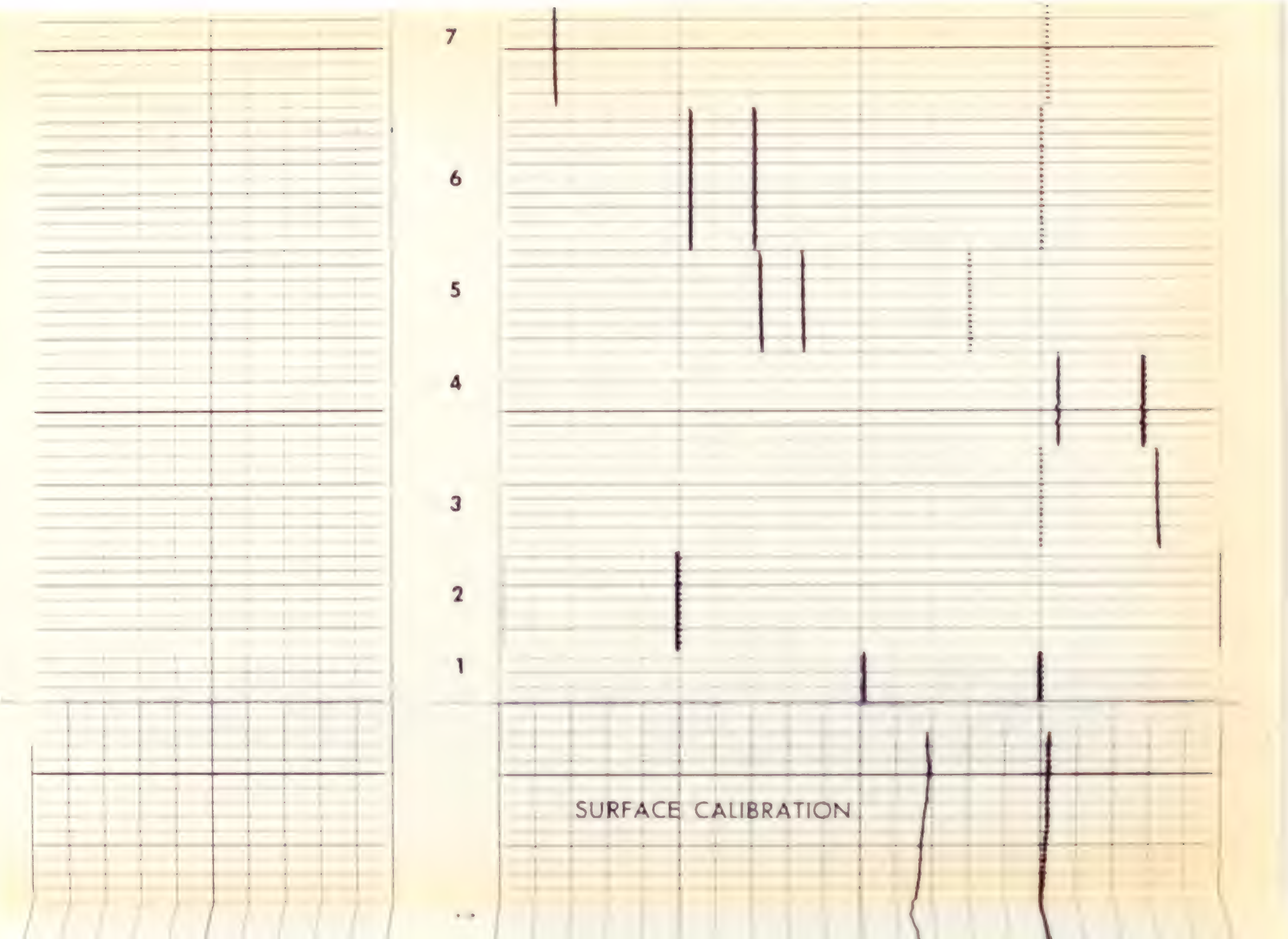
4

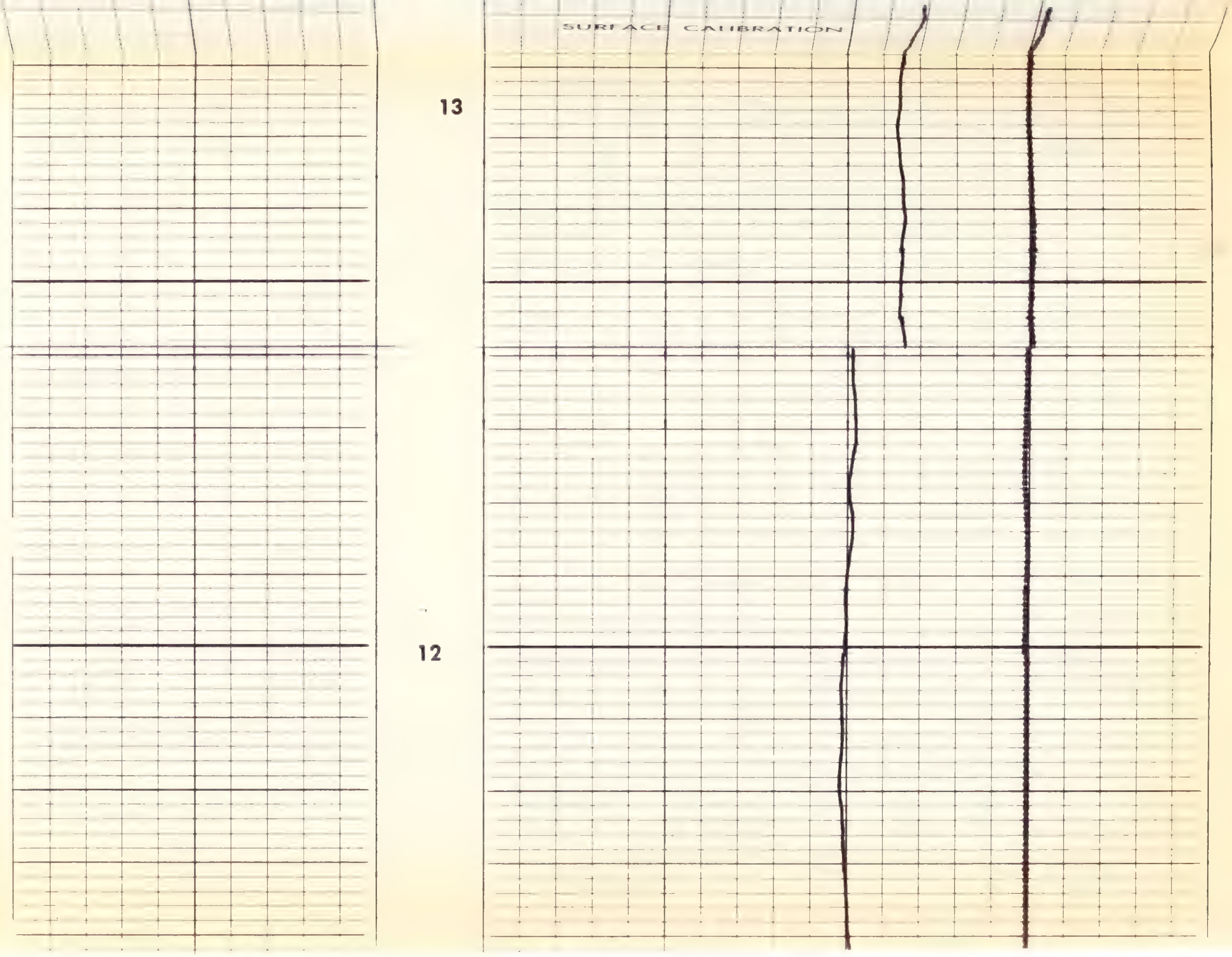
3

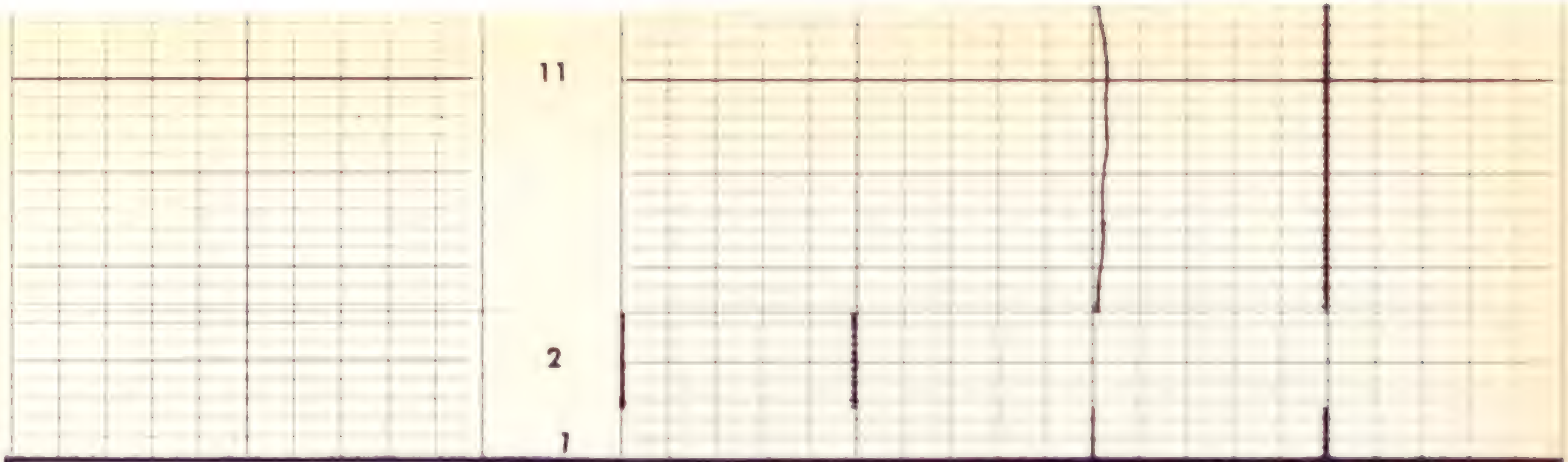

10
9
8
Calibration after Survey
13


12
11
2


2
1
Calibration before Survey
13
12
11


7
6
5
4
3
2
1
SURFACE CALIBRATION


SURFACE CALIBRATION
13
12



COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

PANEL TEST

	RATIO	OH POROSITY			CH POROSITY	
		LS ☐	SS ☒	DOL ☐	SS ☐	LS ☐
3.	1	1.6	4.9	−0.2	2.4	0.1
4.	2	15.6	19.7	8.1	13.0	9.0
5.	3	31.3	36.0	25.2	29.1	24.1
6.	4	52.2	61.4	53.0	52.2	45.2

7. POROSITY NORMALIZED WITH CNB-A IN PLACE
   7A. TOOL IN NCT-B
8. LOG POSITION WITH CNB-A IN PLACE
   8A. LOG POSITION WITH TOOL IN NCT-B

OH			CH	
LS	SS	DOL	SS	LS
18	22.2	10.4	15.3	11.2

$$\text{RATIO (NORMALIZED)} = \frac{2.17}{\text{RATIO (NCT-B)}} \quad \text{RATIO LOG}$$

FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

	POS	ρ	$\triangle\rho$
3.	# 1	2.92	.00
4.	# 2	2.78	+.14
5.	# 3	2.42	−.10
6.	# 4	2.35	.00
7.	# 5	2.08	.01

8. MECHANICAL ZERO CALIPER
9. 8″ RING
10. 12″ RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\triangle\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\triangle\rho = .015$

CALIBRATION RECORD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL AQUIFER TEST #1-C

FIELD SORGHAM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1645
SCHL. TD 1646
DRLR TD 1640
Elev:
KB
DF
GL 6909

COUNTY RIO BLANCO, [illegible]

Schlumberger

TEMPERATURE LOG

COUNTY RIO BLANCO, COLO.
FIELD or LOCATION SORGHUM GULCH
WELL AQUIFER TEST #1-C
COMPANY ATLANTIC RICHFIEL

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL AQUIFER TEST #1-C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION

Sec. 7 Twp. 3-S Rge. 96-W

Other Services:
DIL
FDC--CNL-GR
BHC-GR

Permanent Datum: GL ; Elev.: 6909
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6909

Date	8/18/74		
Run No.	ONE		
Depth—Driller	1640		
Depth—Logger	1646		
Btm. Log Interval	1646		
Top Log Interval	340		
Casing—Driller	8-5/8 @ 59	@	@
Casing—Logger	61		
Casing Size 1	8-5/8 To 59	To	To
2	To	To	To
Casing Weight 1			
2			
Casing Thickness 1			
2			
Bit Size 1	To	To	To
2	To	To	To
Type Fluid in Hole	WATER		
Dens. Visc.	8.3		
Time Since Circ.	8 HOURS		
BHT	86		
Equip. Location	5602 GR.JUNCTION		
Recorded By	BARGHOUHI		
Witnessed By	TAIT		

The well name, location and borehole reference data were furnished by the customer

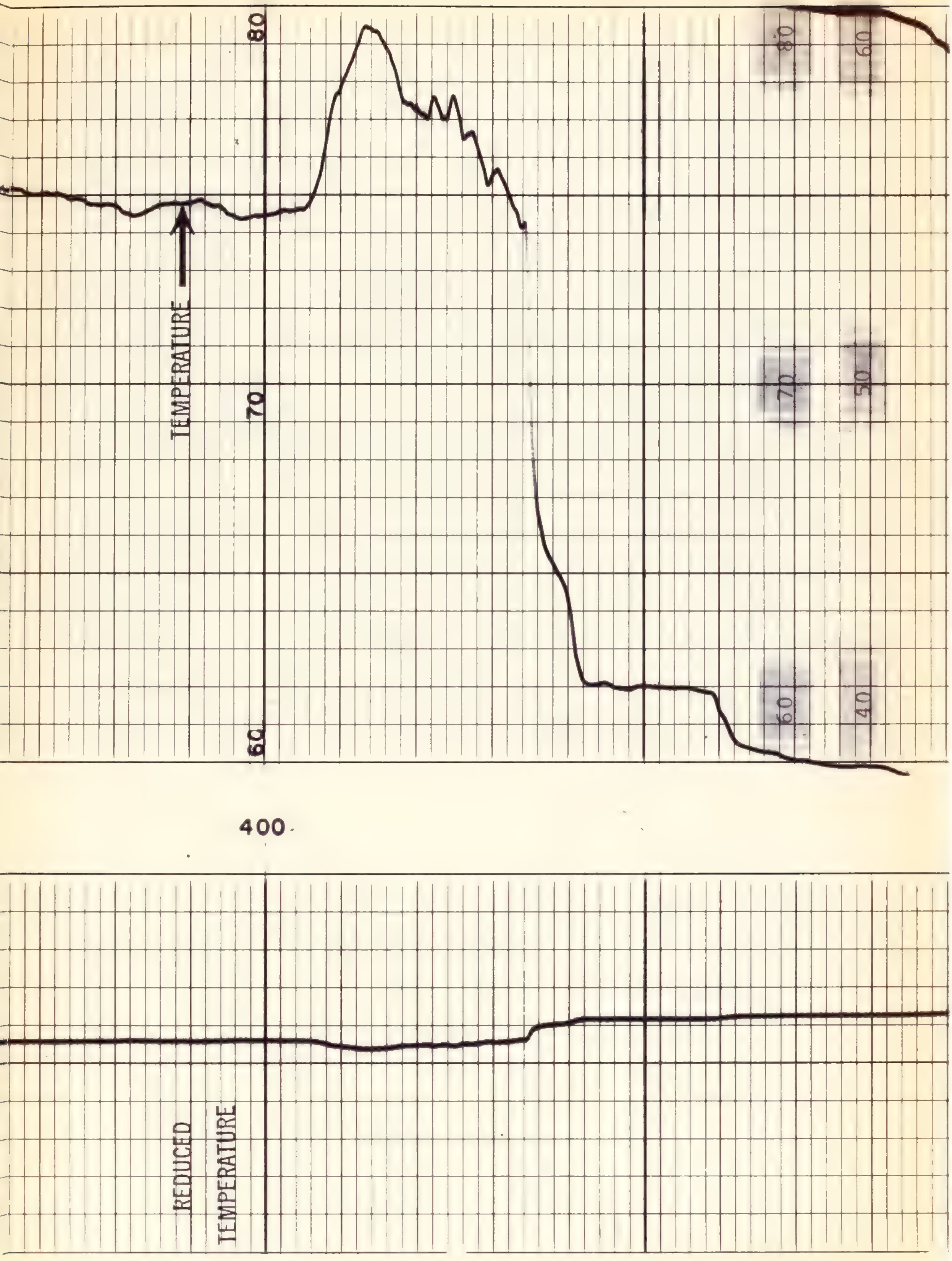
REMARKS: 8/18 @ 1400 HOURS

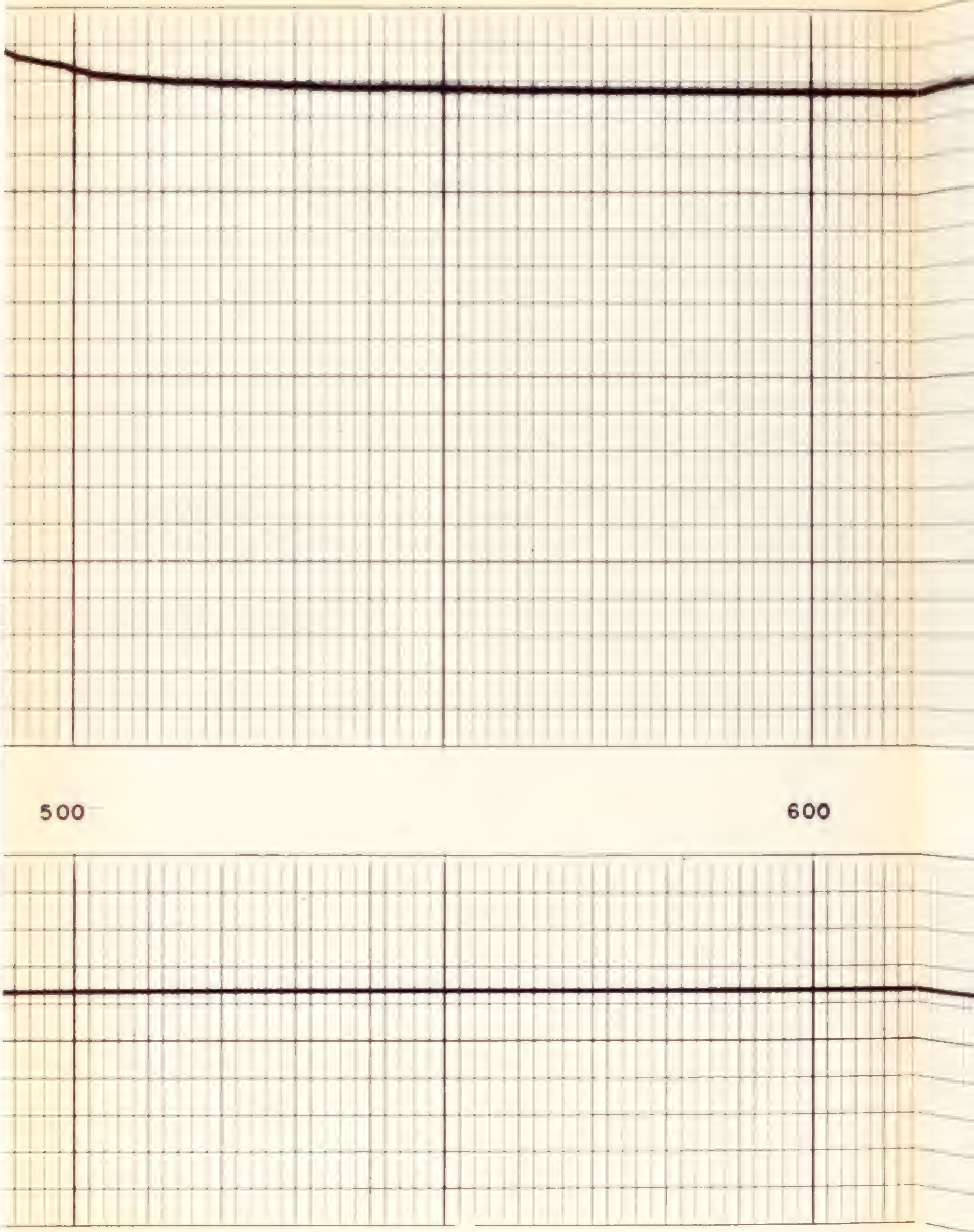
CEMENTATION DATA

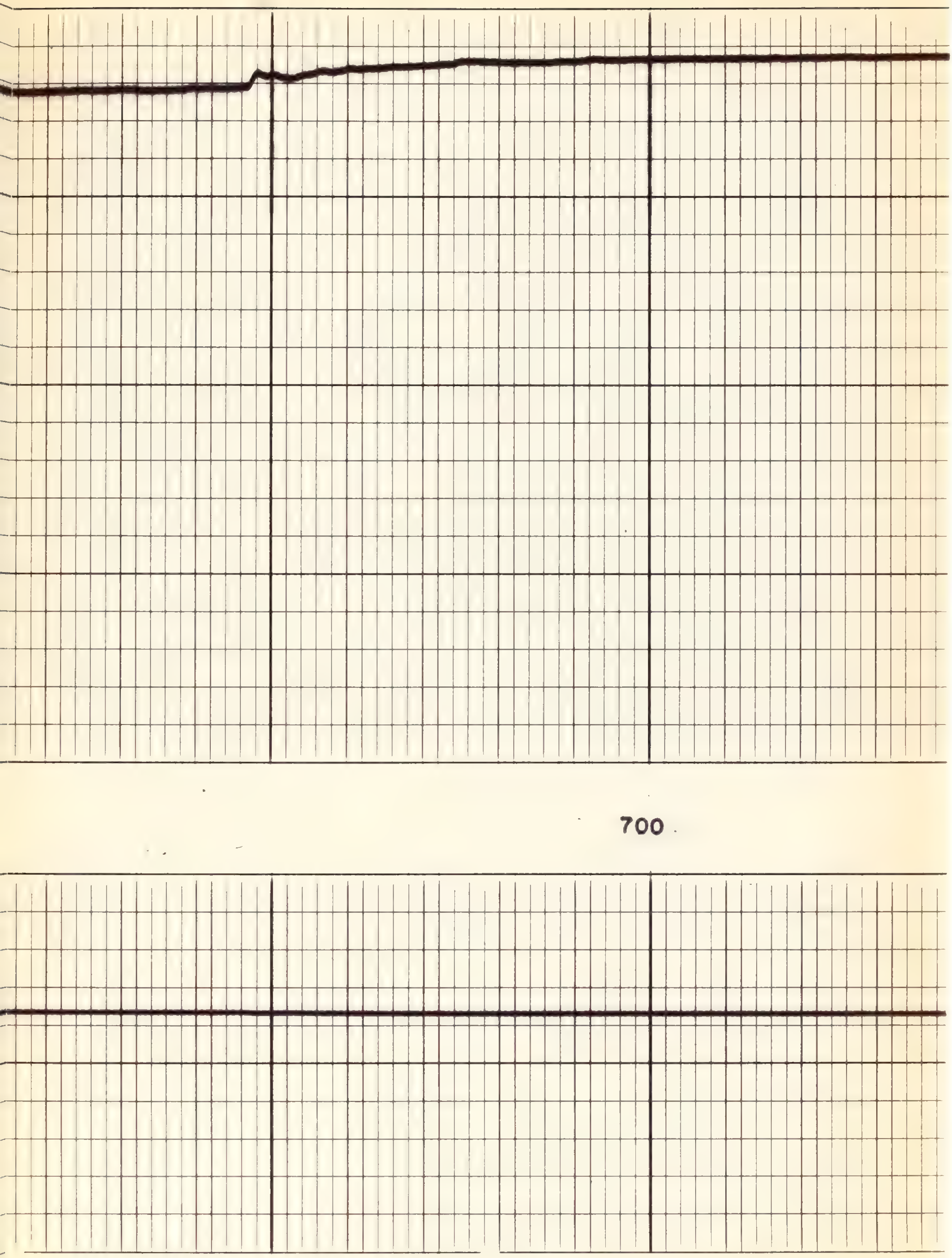
Date	Depth	Type of Cement	Nb of Sacks	Additives	Calculated Top

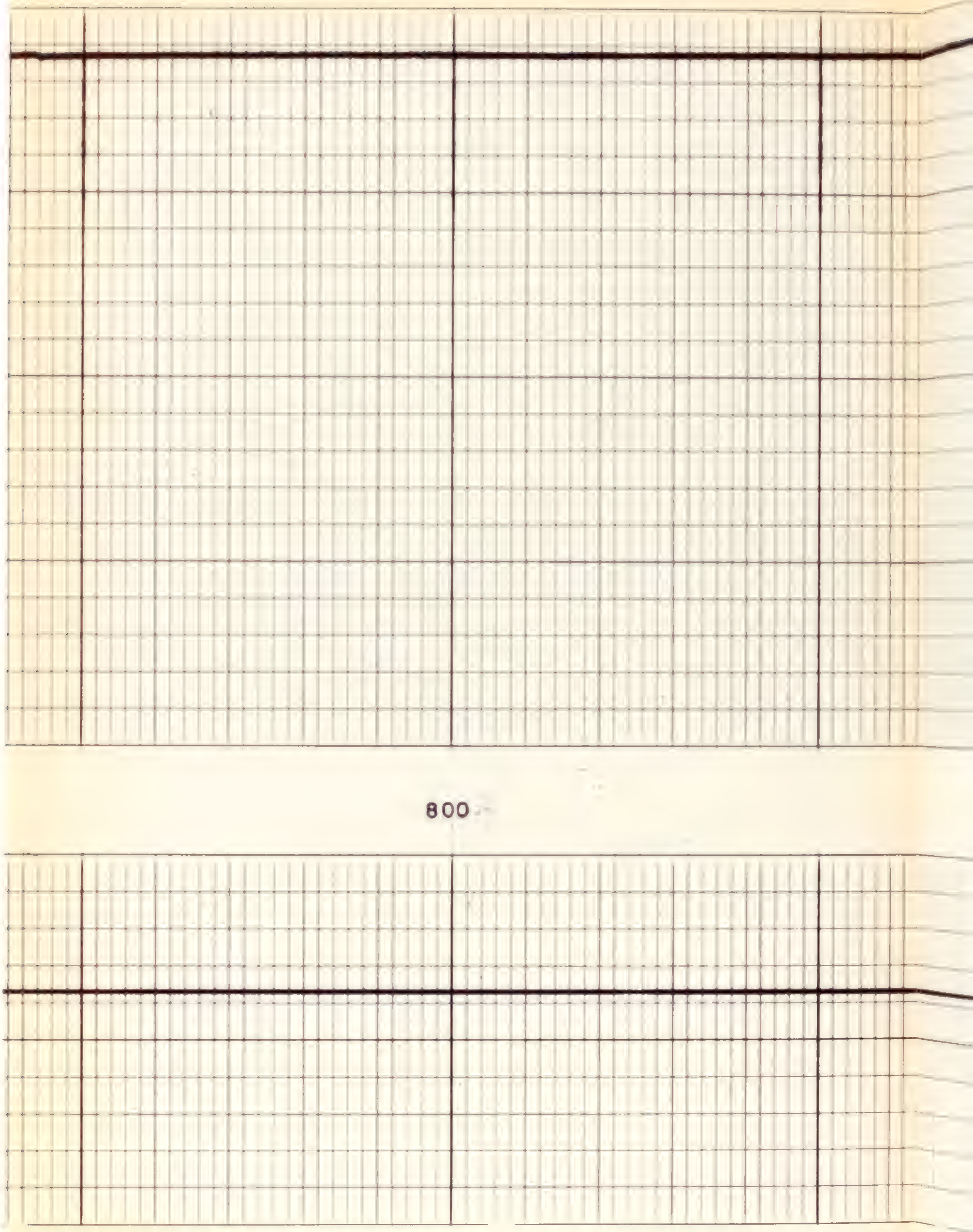
REDUCED SENSITIVITY TEMPERATURE

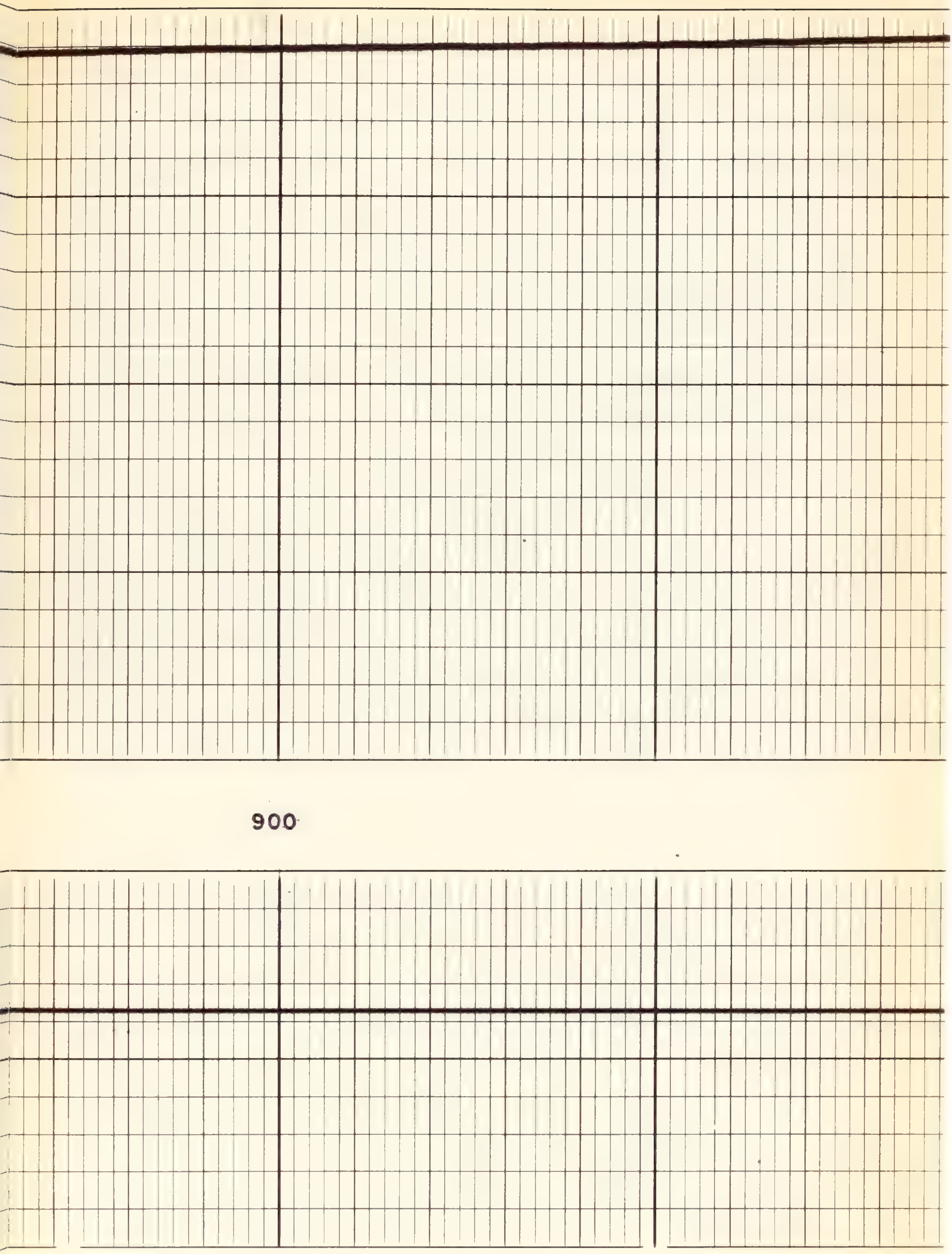
TEMPERATURE °F.

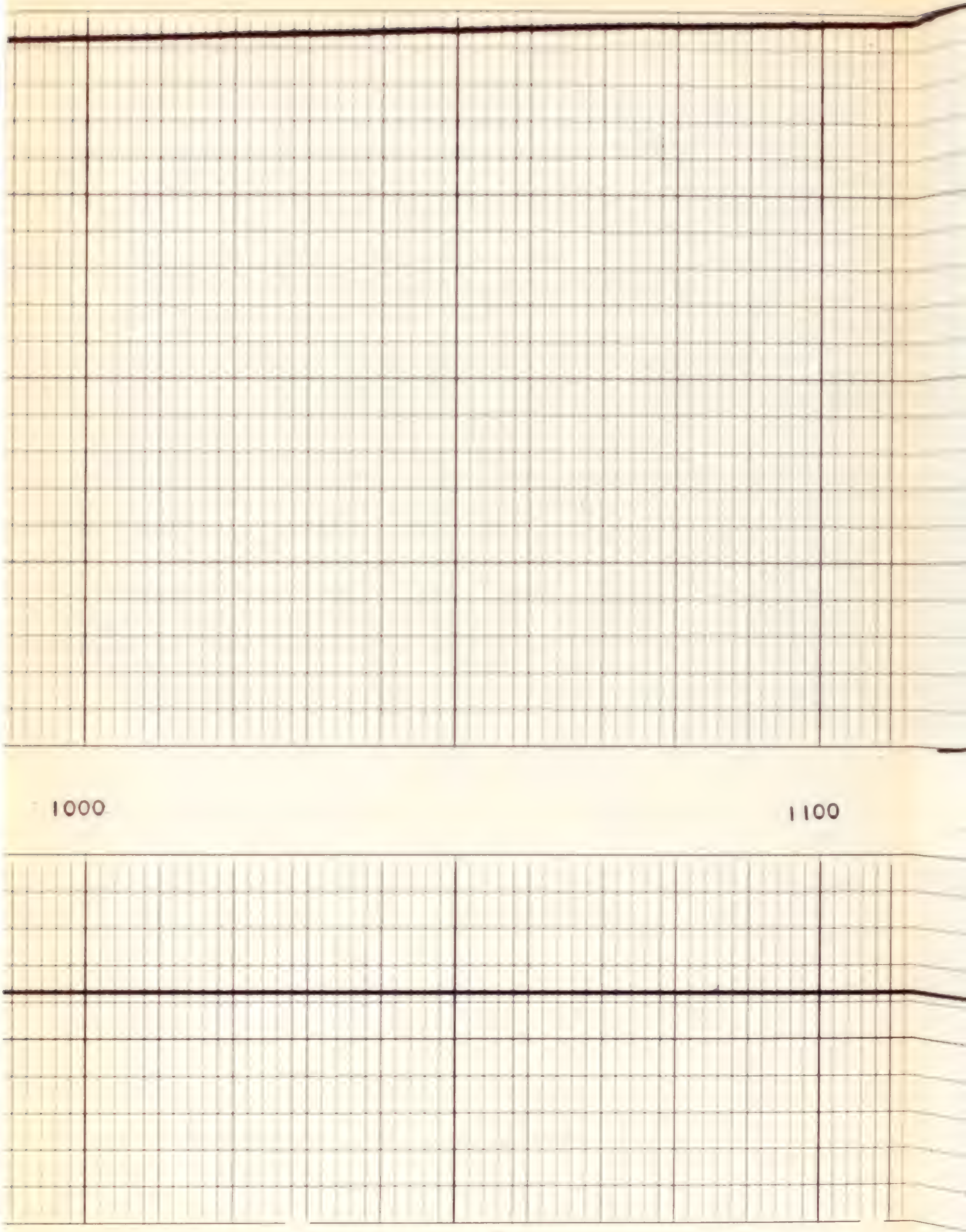

80
70
60
TEMPERATURE
80
70
60
60
50
40
400
REDUCED
TEMPERATURE

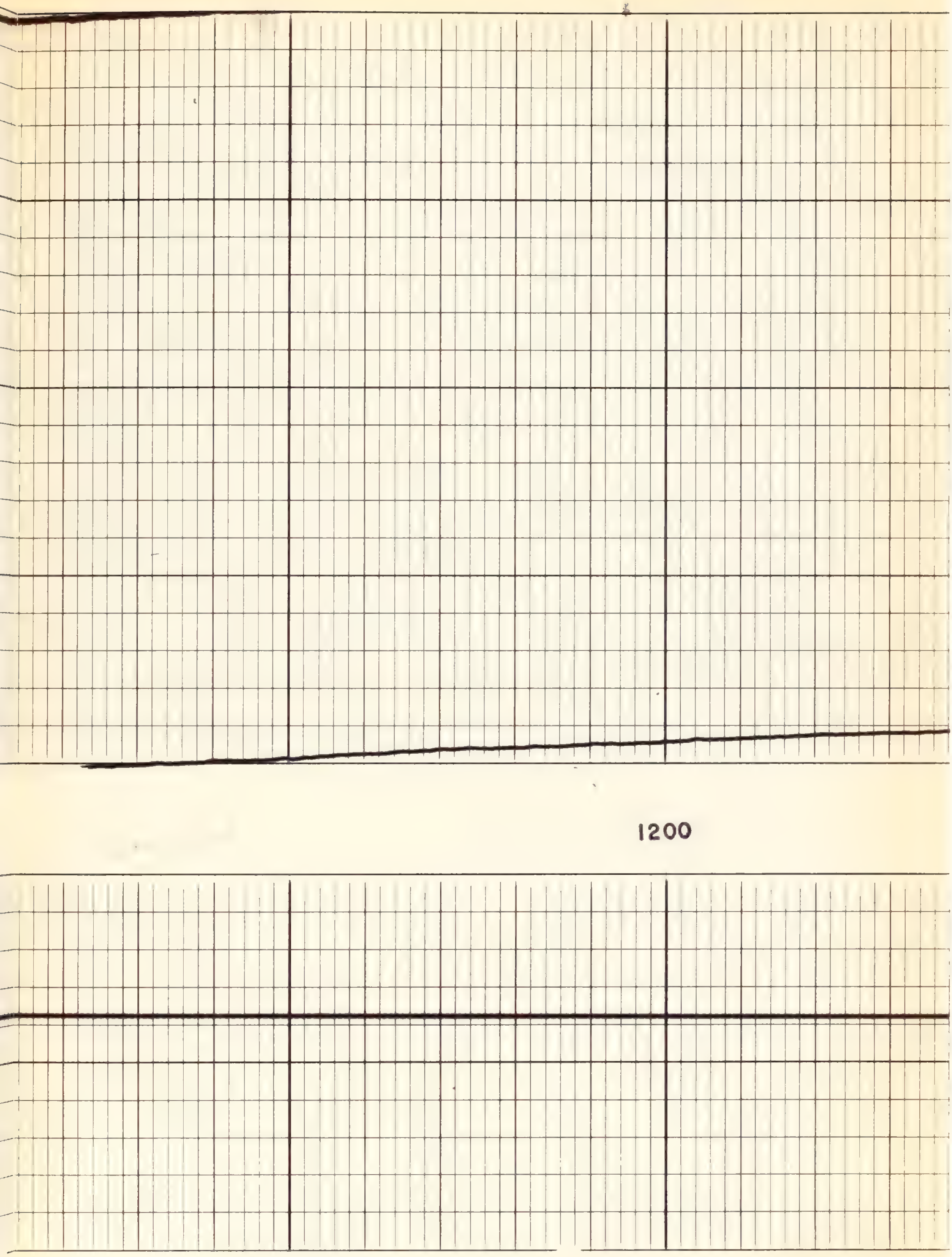

500
600

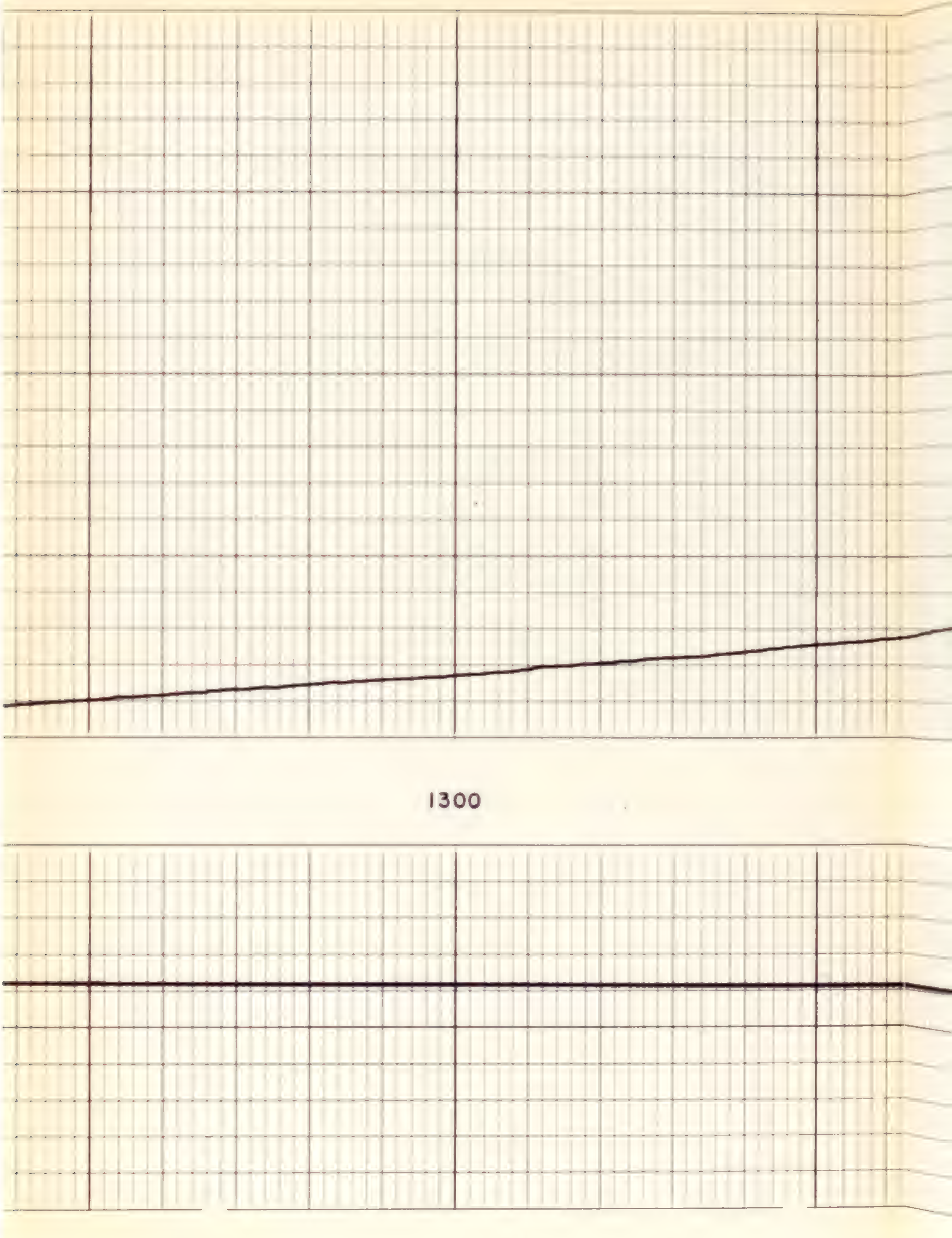

700

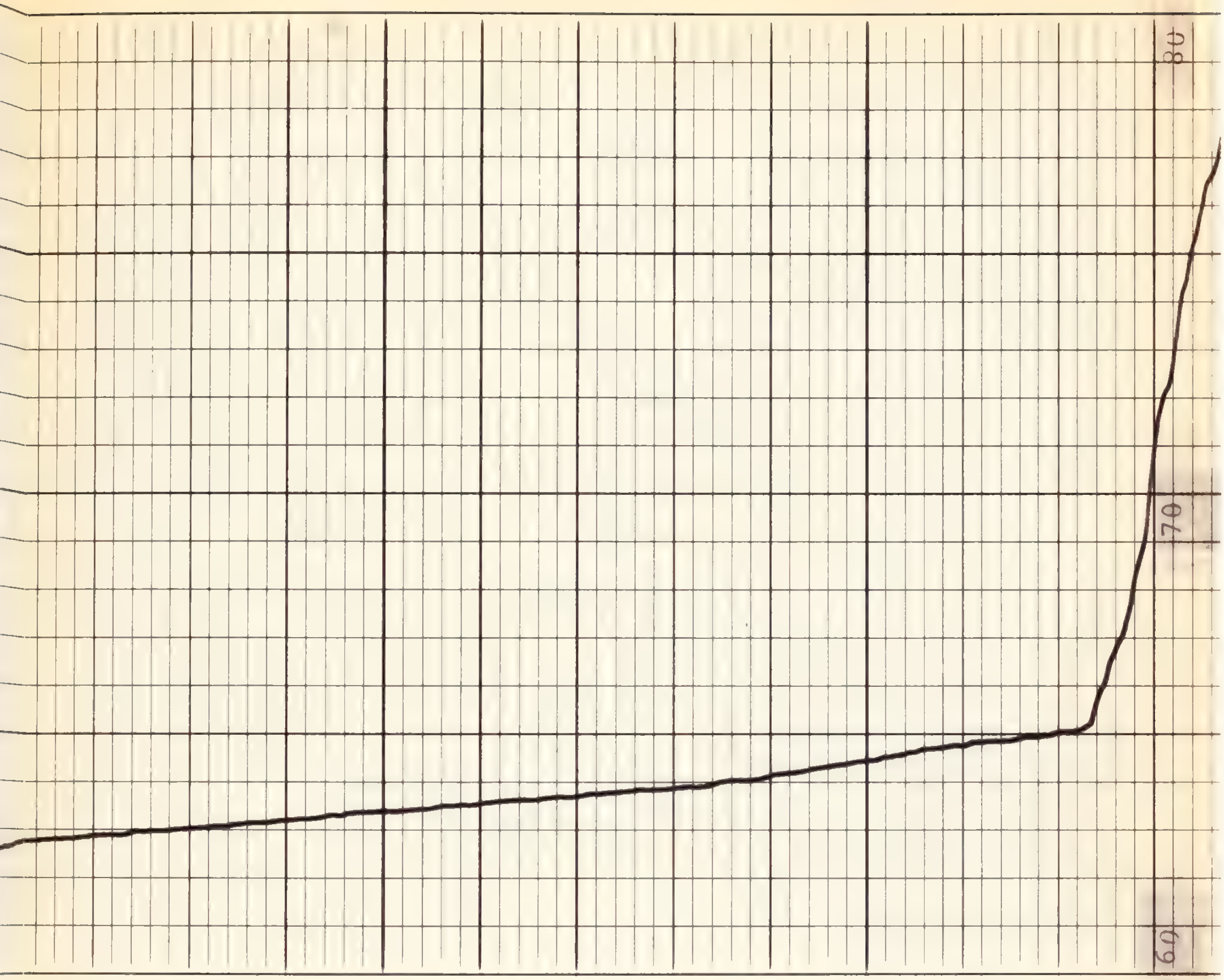

800


900

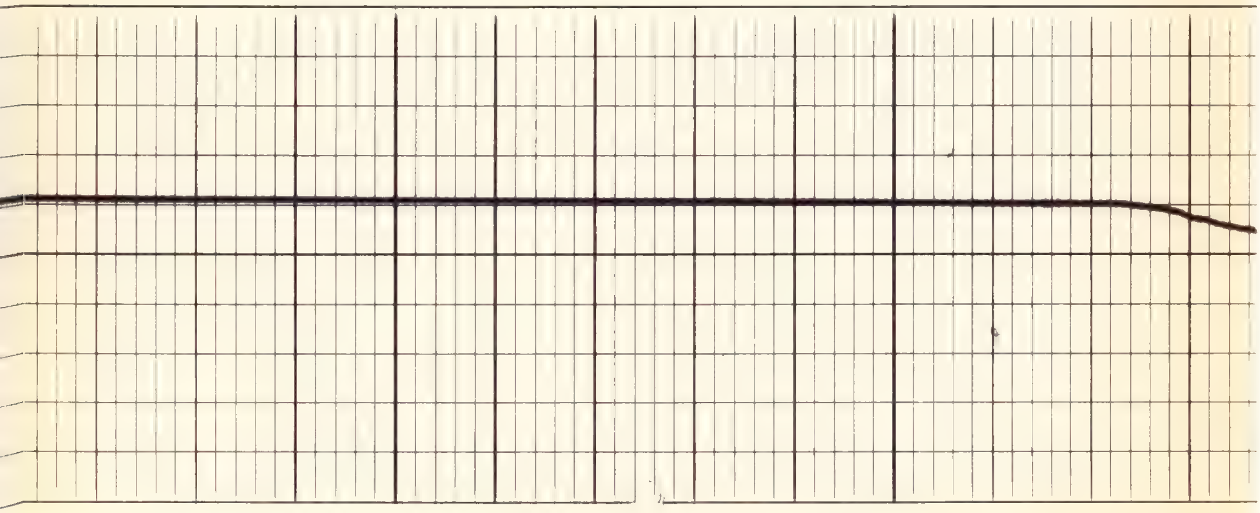

1000
1100

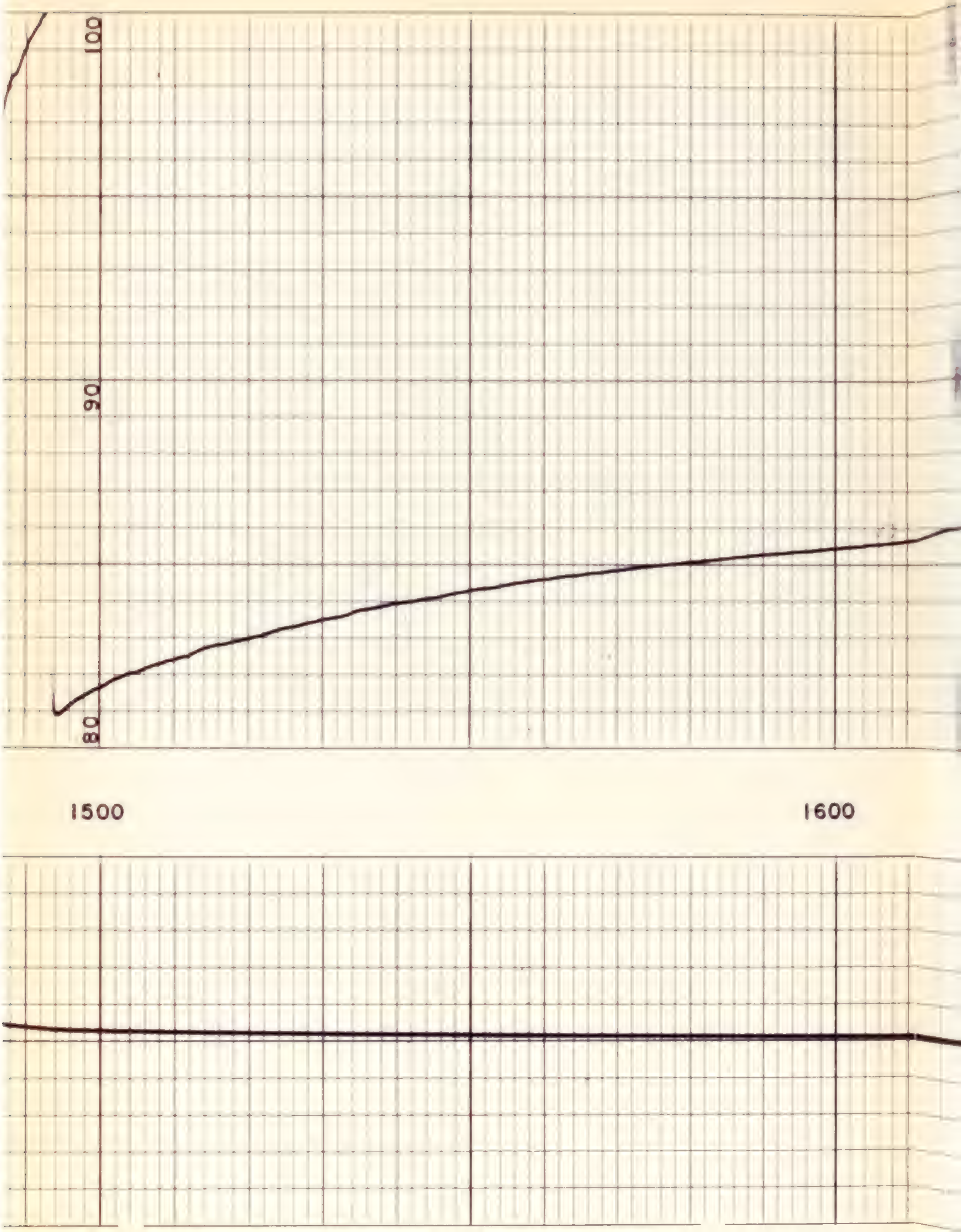

1200

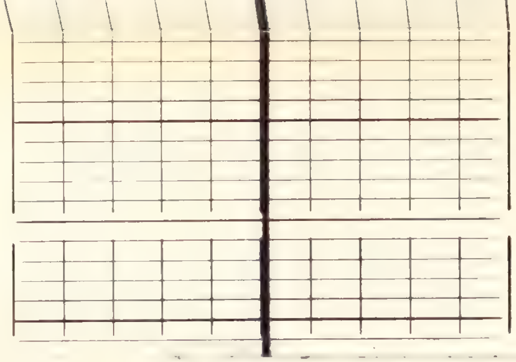

1300

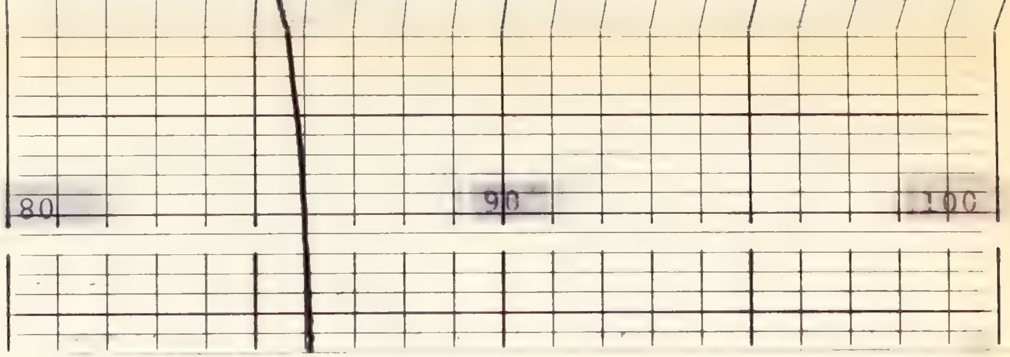


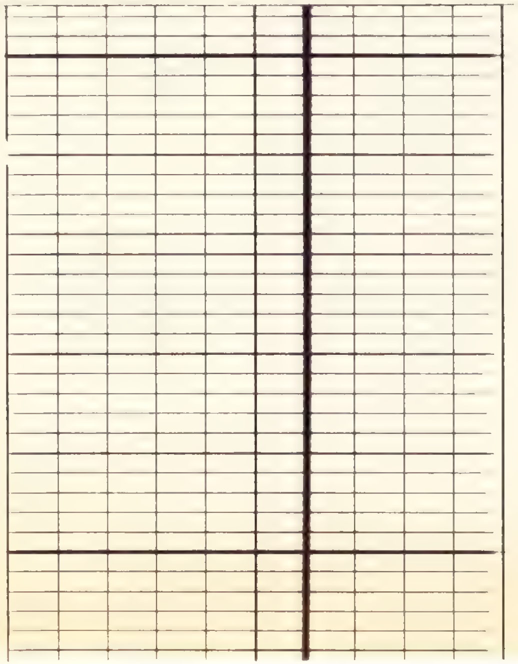
1400

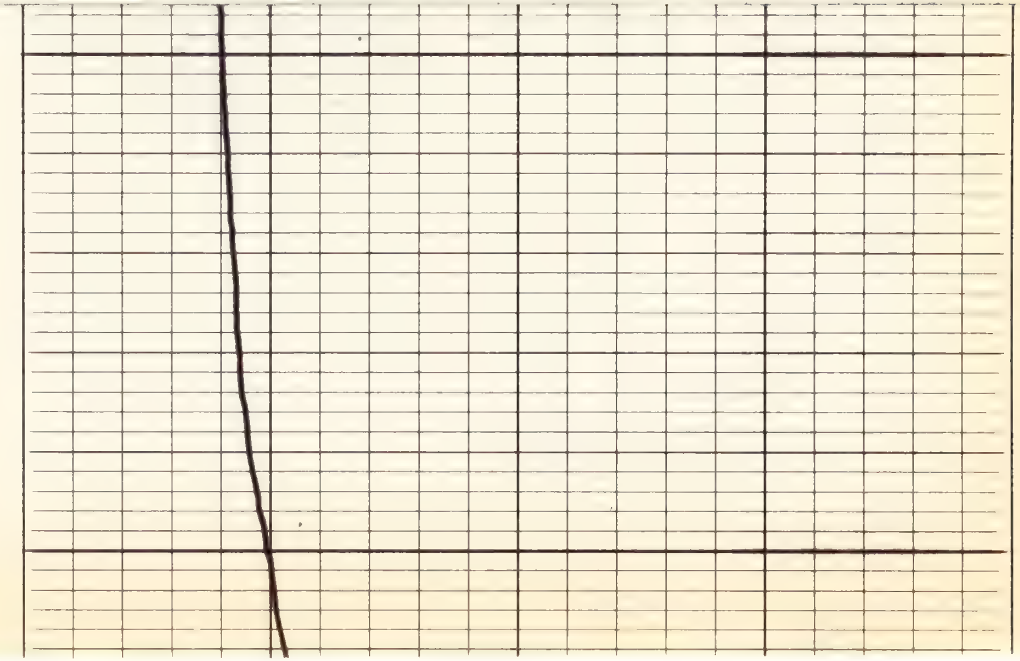


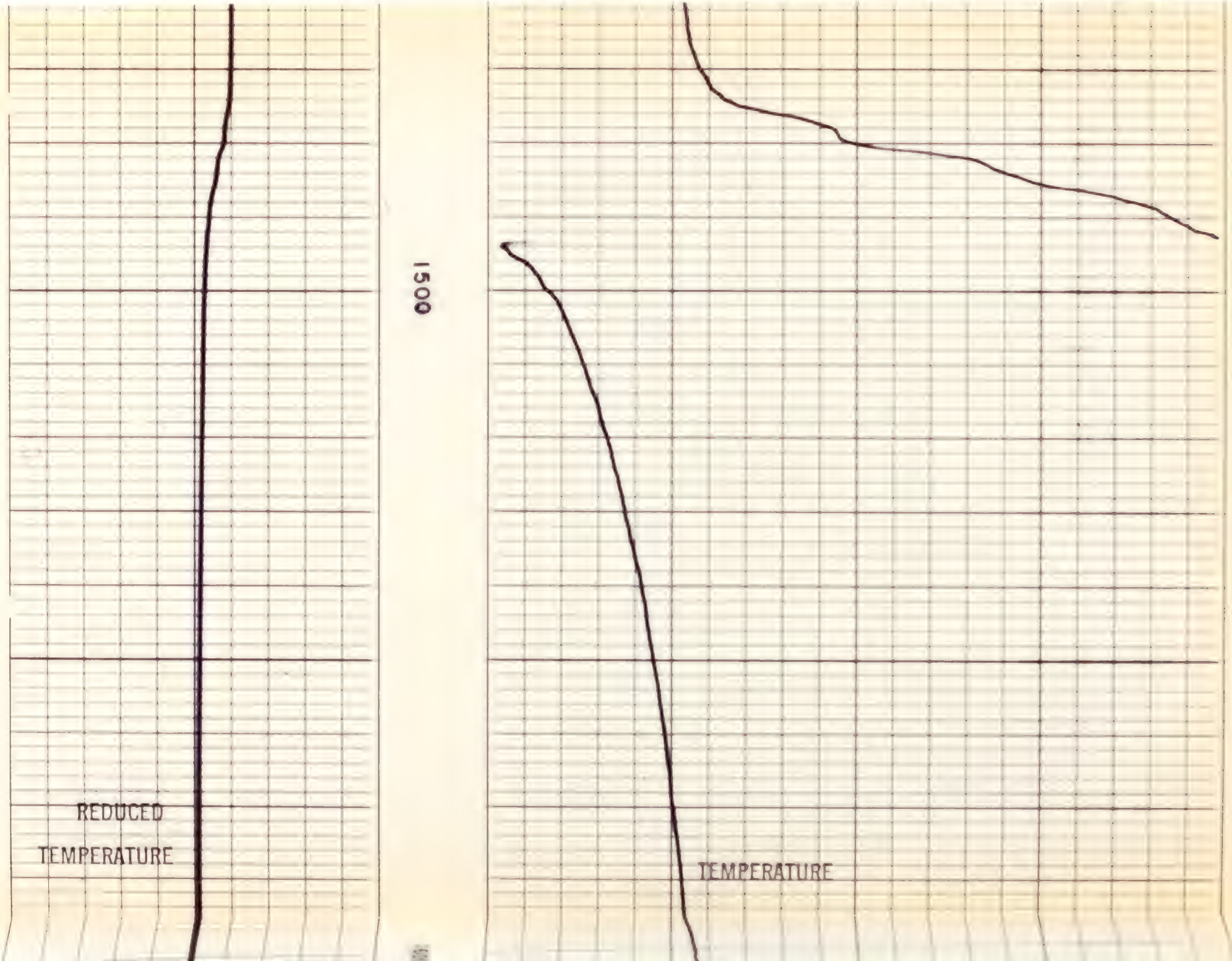

100
90
80
1500
1600

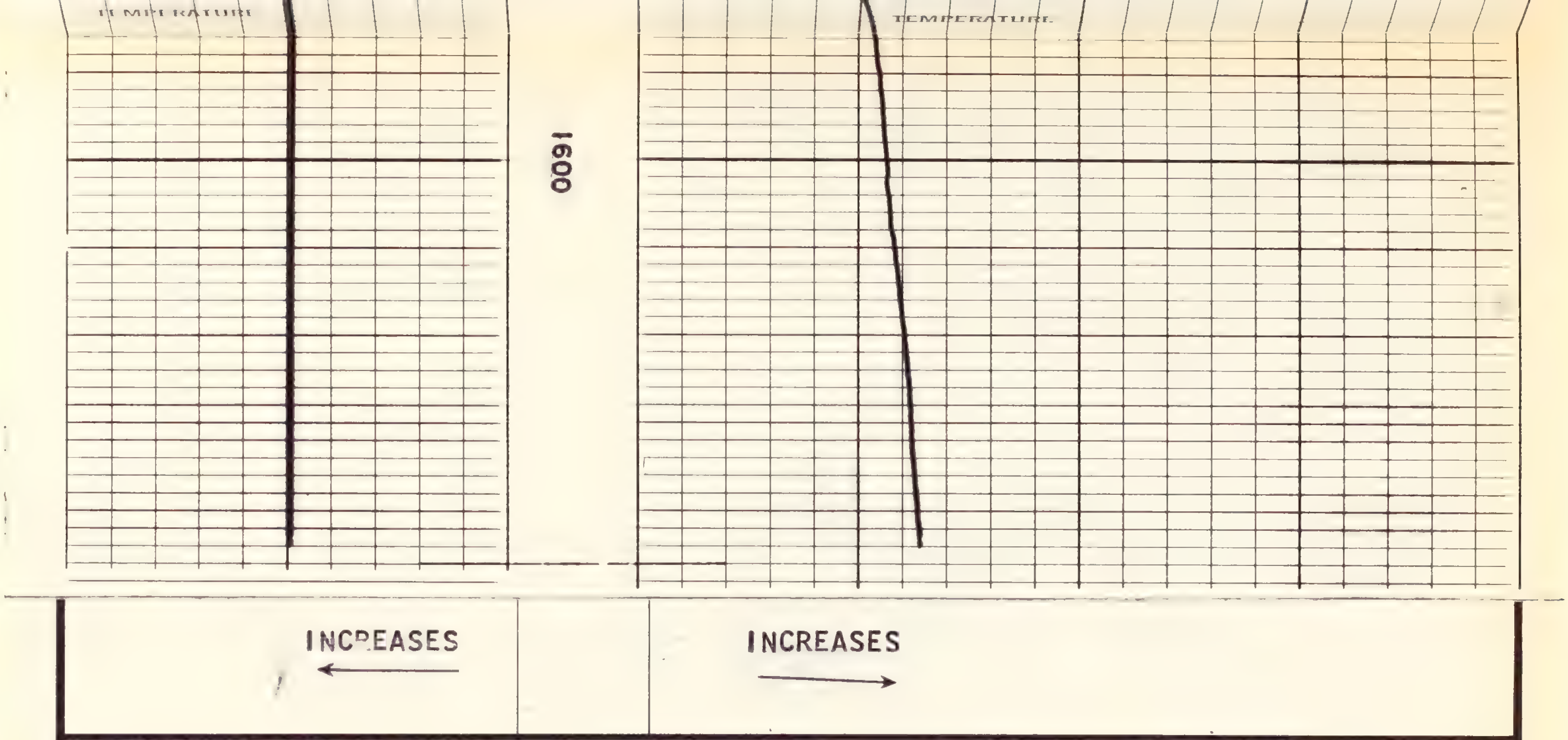



80
90
100






1500
REDUCED
TEMPERATURE
TEMPERATURE



TEMPERATURE °F.

COMPANY THE ATLANTIC RICHFIELD COMPANY.

WELL AQUIFER TEST #1-C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. F. R. 1646
SCHL. T. D. 1646
DRLR. T. D. 1640

Schlumberger

BOREHOLE COMPENSATED SONIC LOG - GAMMA RAY

(WITH CALIPER)

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL AT-1C
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL AT-1C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: API Serial No. 15129

Sec. 7 Twp. 3S Rge. 96W

Other Services:

Permanent Datum: GROUND LEVEL ; Elev.: 6909
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6909

Date	9-11-74			
Run No.	ONE			
Depth—Driller	1640			
Depth—Logger	1646			
Btm. Log Interval	1638			
Top Log Interval	468			
Casing—Driller	8 5/8 @ 59	@	@	@
Casing—Logger	----			
Bit Size	7 7/8			
Type Fluid in Hole	WATER			
Fluid Level	436			
Dens. | Visc.	-- | --	|	|	|
pH | Fluid Loss	-- | - ml	| ml	| ml	| ml
Source of Sample	----			
R_m @ Meas. Temp.	-- @ --°F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	-- @ --°F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	-- @ --°F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}	-- | --	|	|	|
R_m @ BHT	-- @ --°F	@ °F	@ °F	@ °F
Time Since Circ.	----			
Max. Rec. Temp.	---- °F	°F	°F	°F
Equip. | Location	3802 | VERNAL	|	|	|
Recorded By	MARTIN-ST.AUBYN			
Witnessed By	MR. ROSS			

location and borehole reference data were furnished by the customer.

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No.				
Depth - Driller					
Type Fluid in Hole					
Dens.	Visc.				
ph	Fluid Loss		ml		ml
Source of Sample					
Rm @ Meas. Temp.		@	°F	@	°F
Rmf @ Meas. Temp.		@	°F	@	°F
Rmc @ Meas. Temp.		@	°F	@	°F
Source: Rmf	Rmc				
Rm @ BHT		@	°F	@	°F
Rmf @ BHT		@	°F	@	°F
Rmc @ BHT		@	°F	@	°F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE			
Sonic Panel No.	SLP-438			
Sonic Cart No.	SLH-C-189			
Sonic Sonde No.	SLS-DL-497			
Mem. Panel No.	- - -			
G.R. Cart. No.	- - -			
G.R. Panel No.	- - -			
Caliper No.	- - -			
TTR No.	- - -			
Cent. Device	RUBBER			
Stand off - Inches	7 3/4			
Time Const. - Sec.	- - -			
Speed - F.P.M.	30 FPM			

REMARKS

Service Order No. -

CALIBRATION DATA

CALIBRATION	BACKGROUND	SOURCE	CALIB. INCR.	SENS. TAP	SENS. TAP	TIME
GAMMA RAY						

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.	
GAMMA RAY:							

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DEPTHS

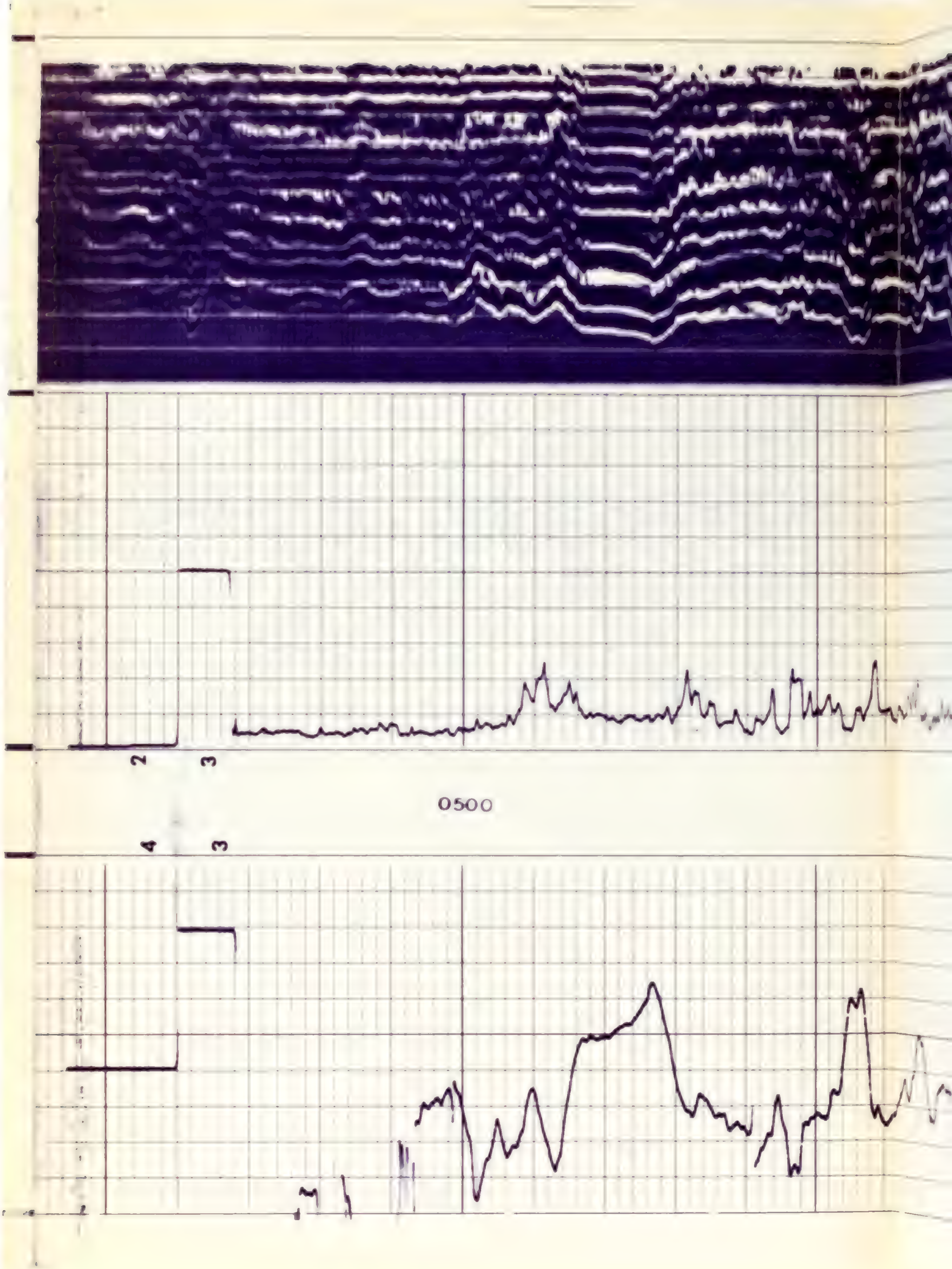
SINGLE RECEIVER ΔT
microseconds

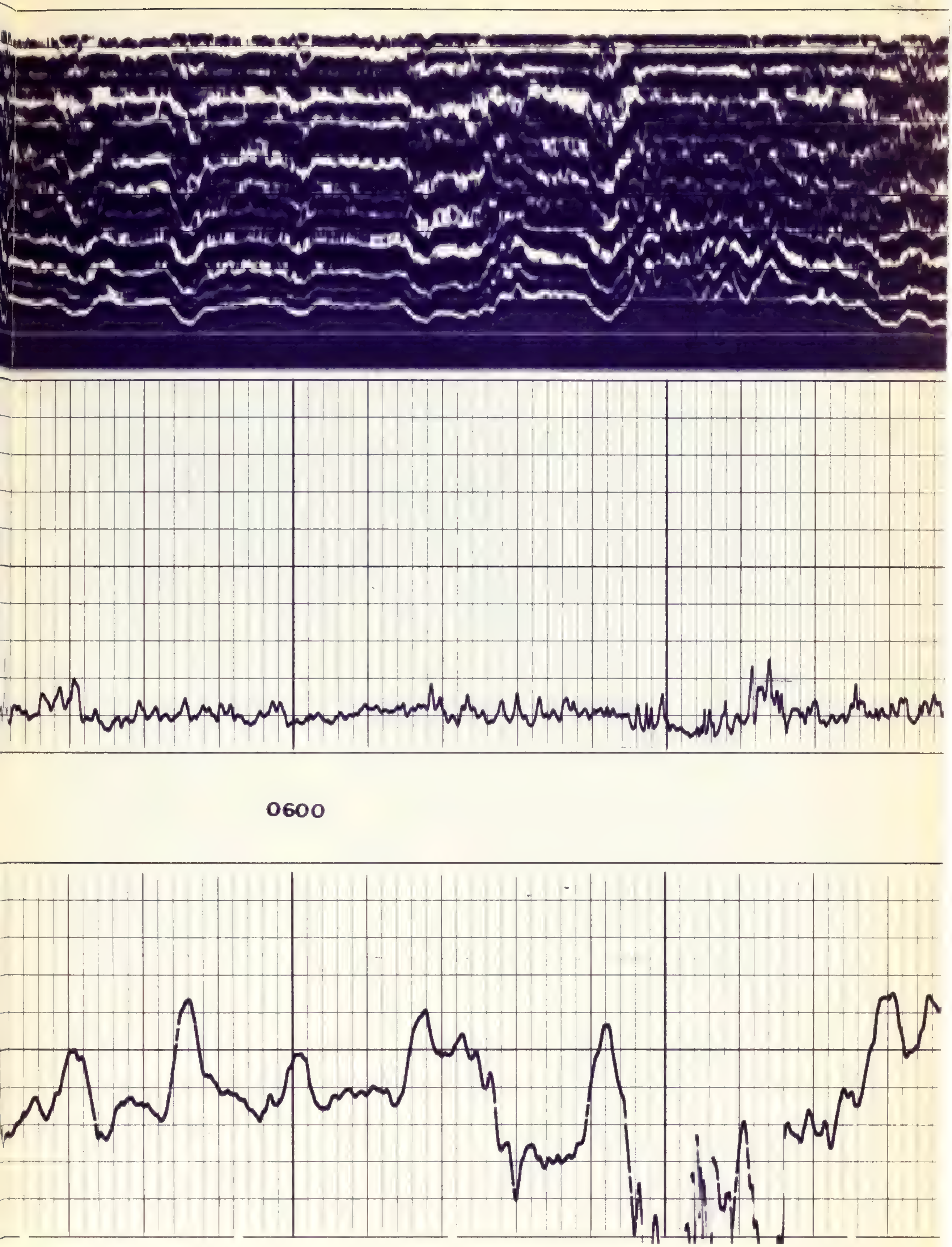
480 160

AMPLITUDE
MILLIVOLTS

0 5

VARIABLE DENSITY
5 FOOT


2
3
0500
4
3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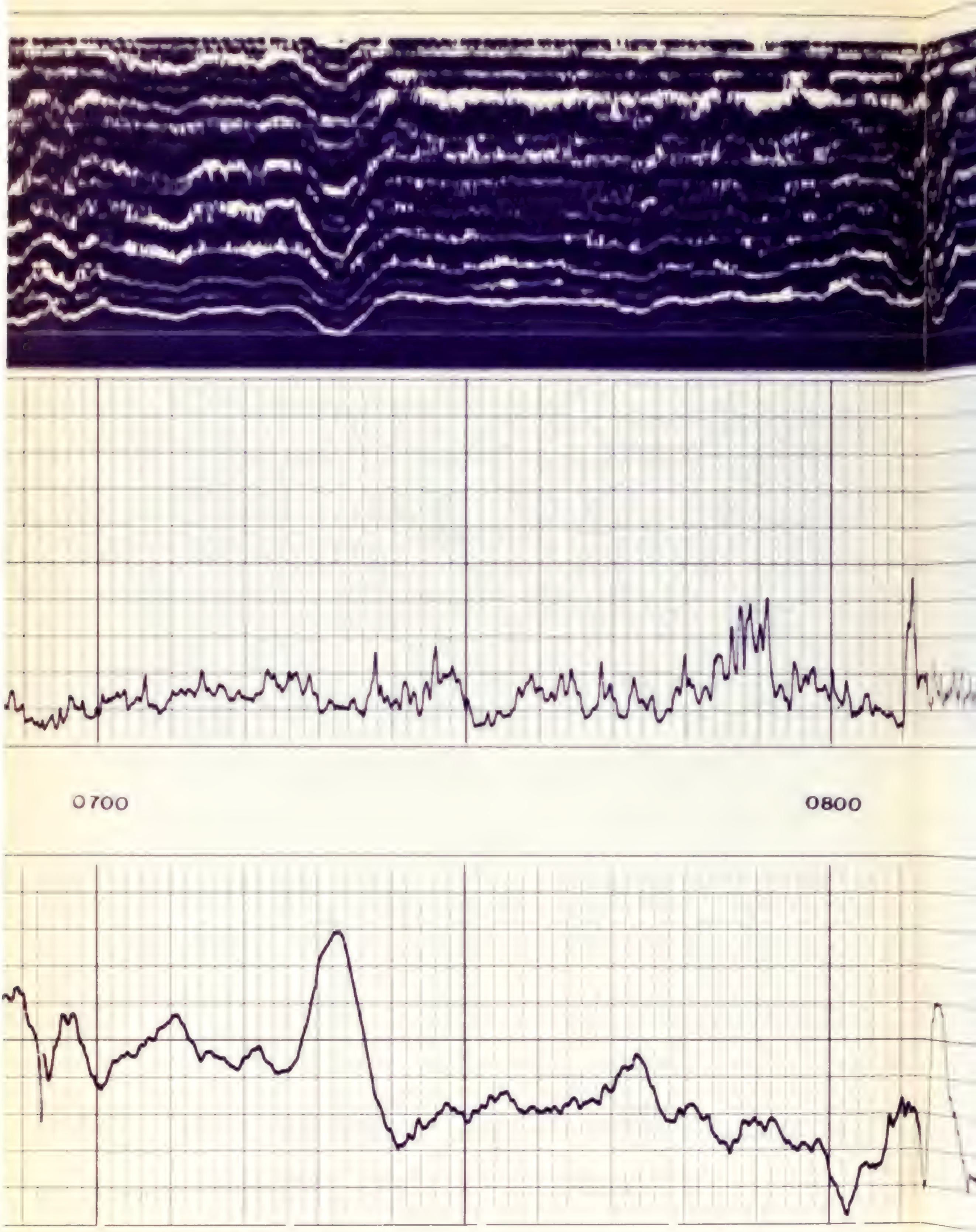
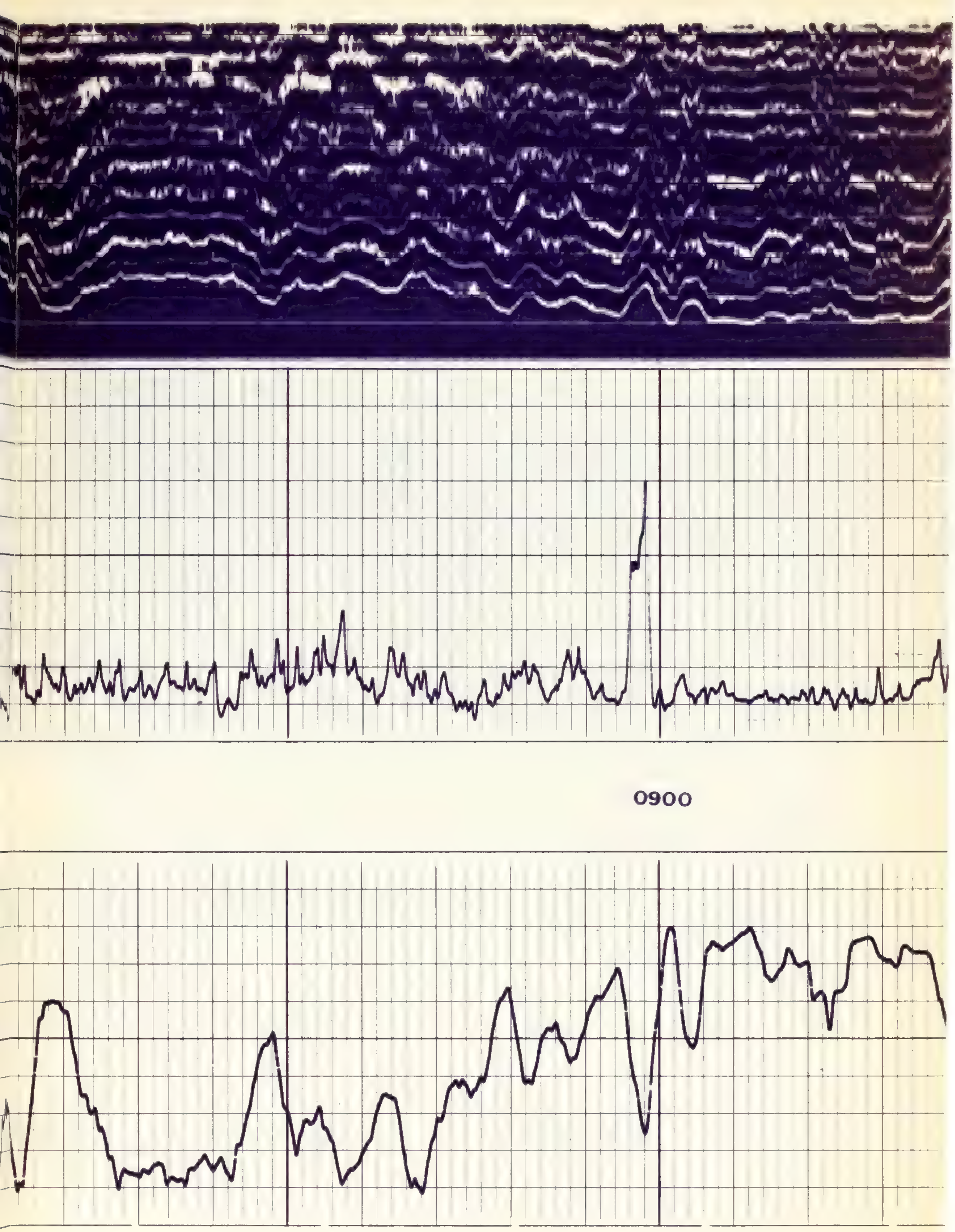


0700
0800



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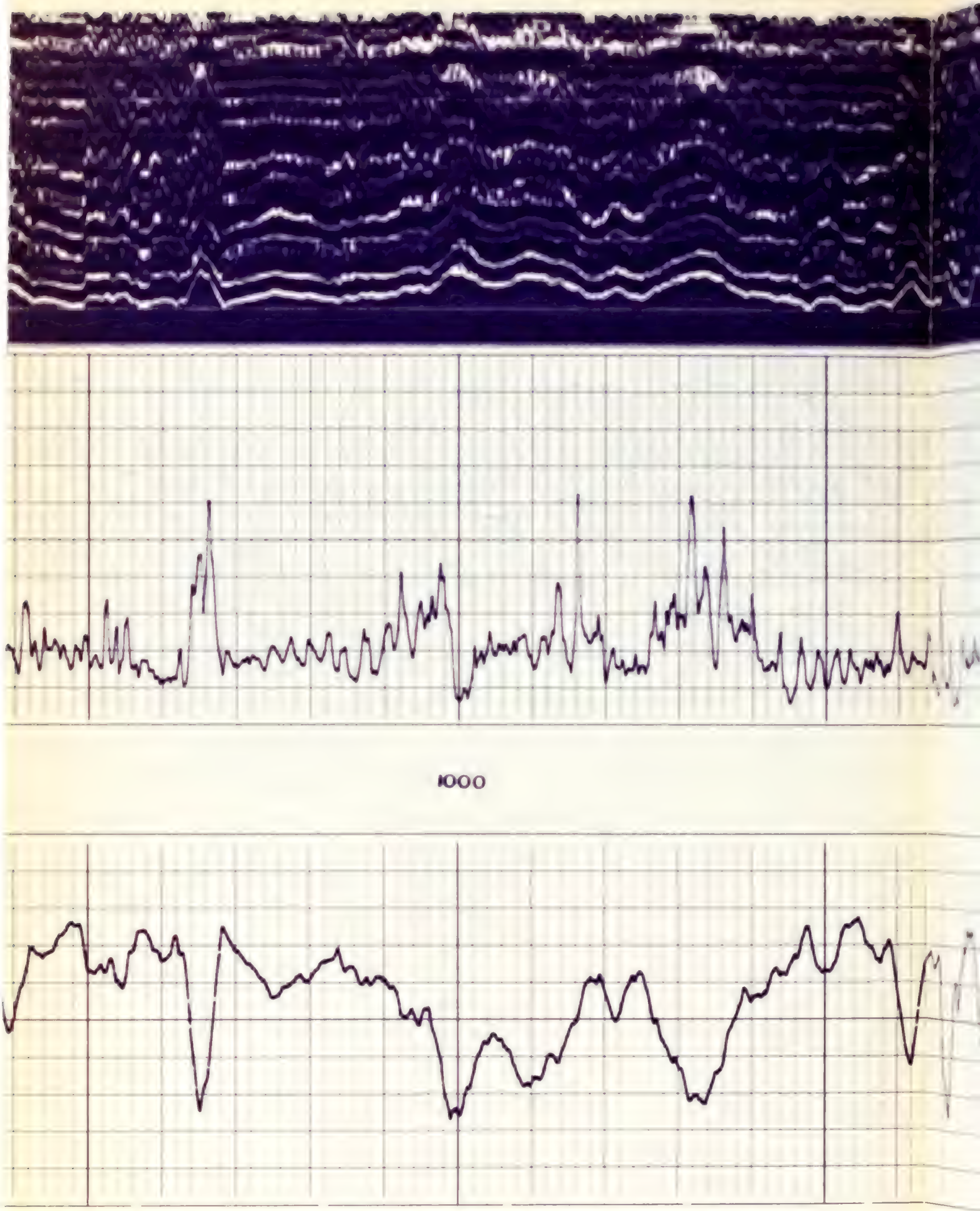
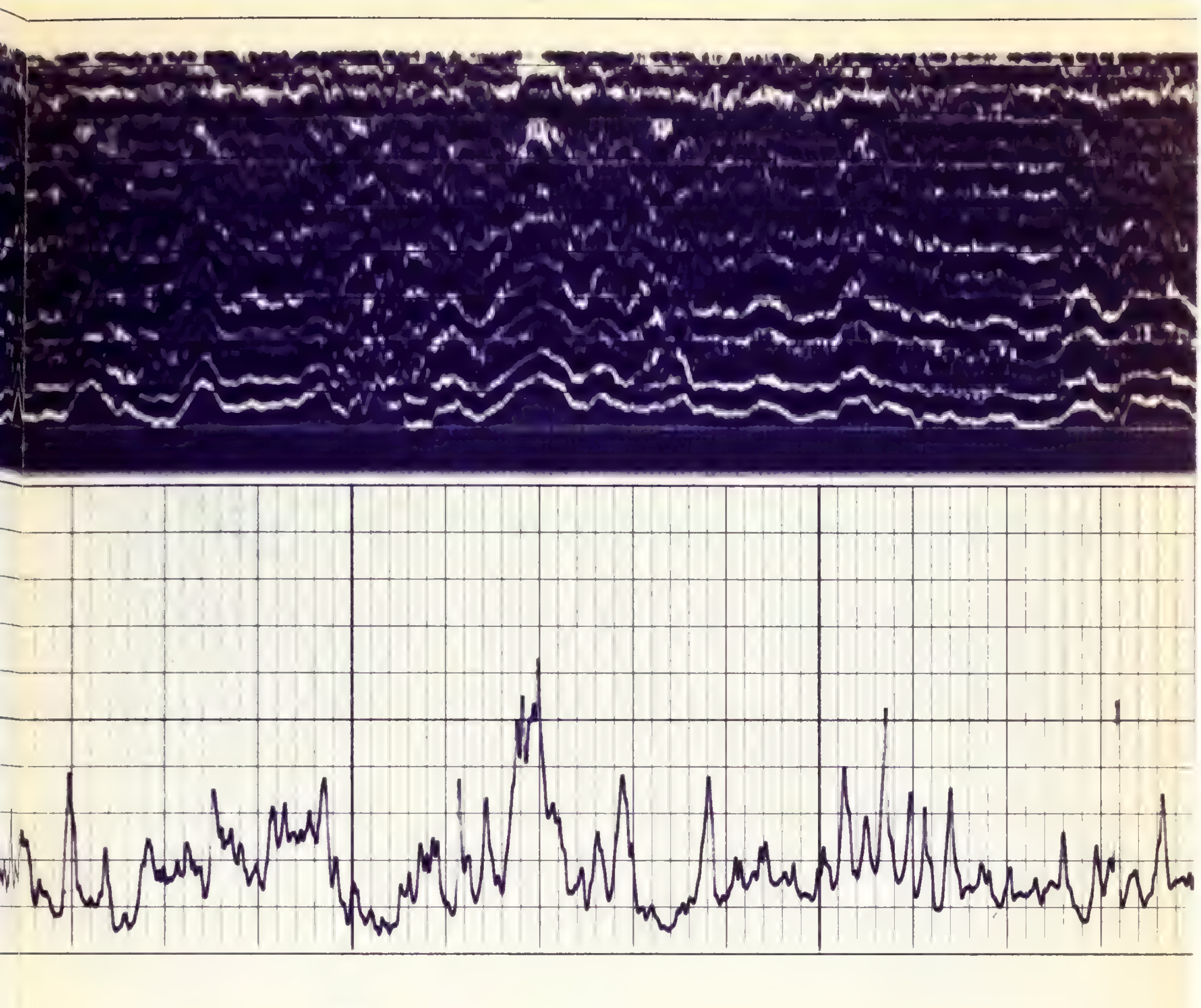
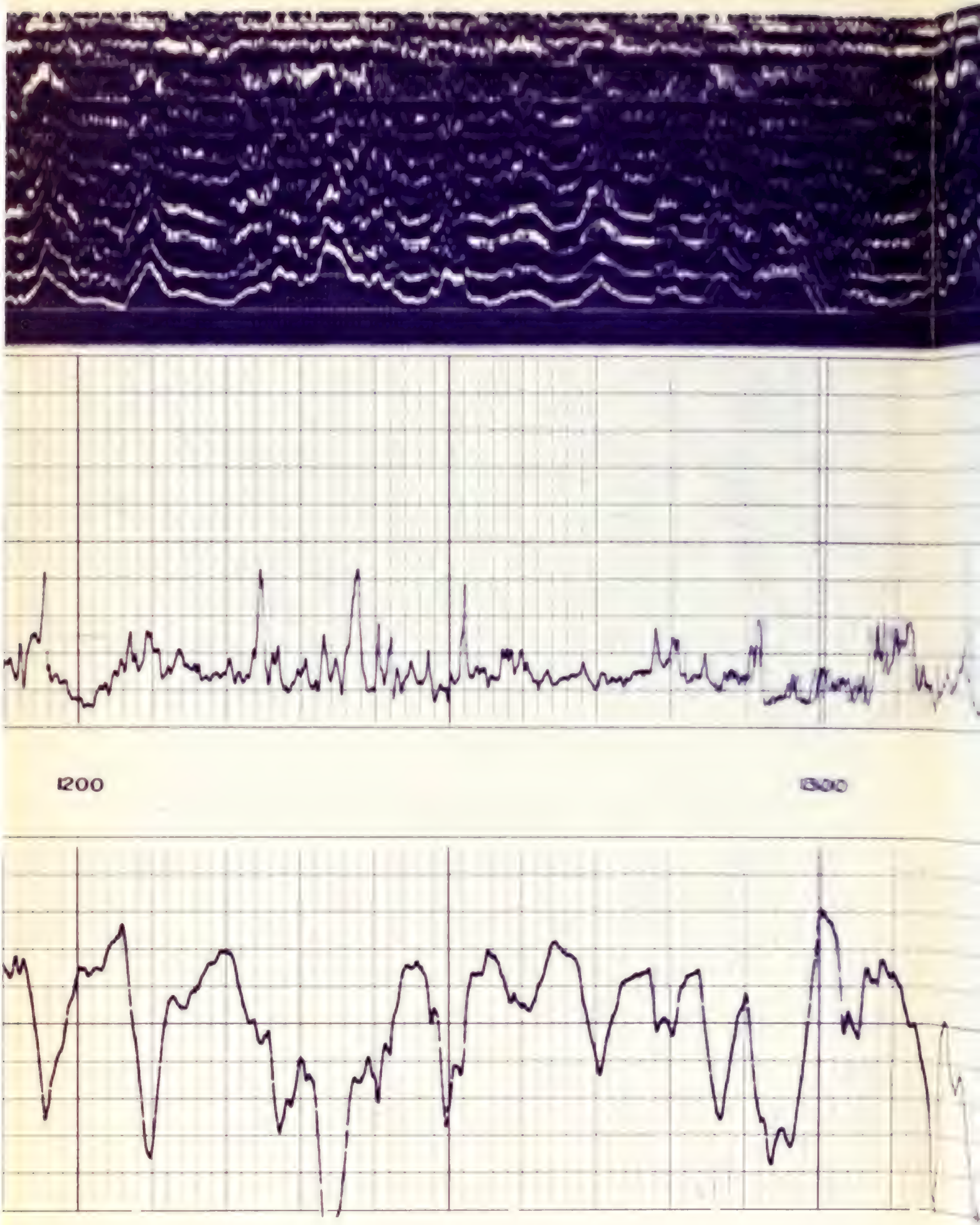
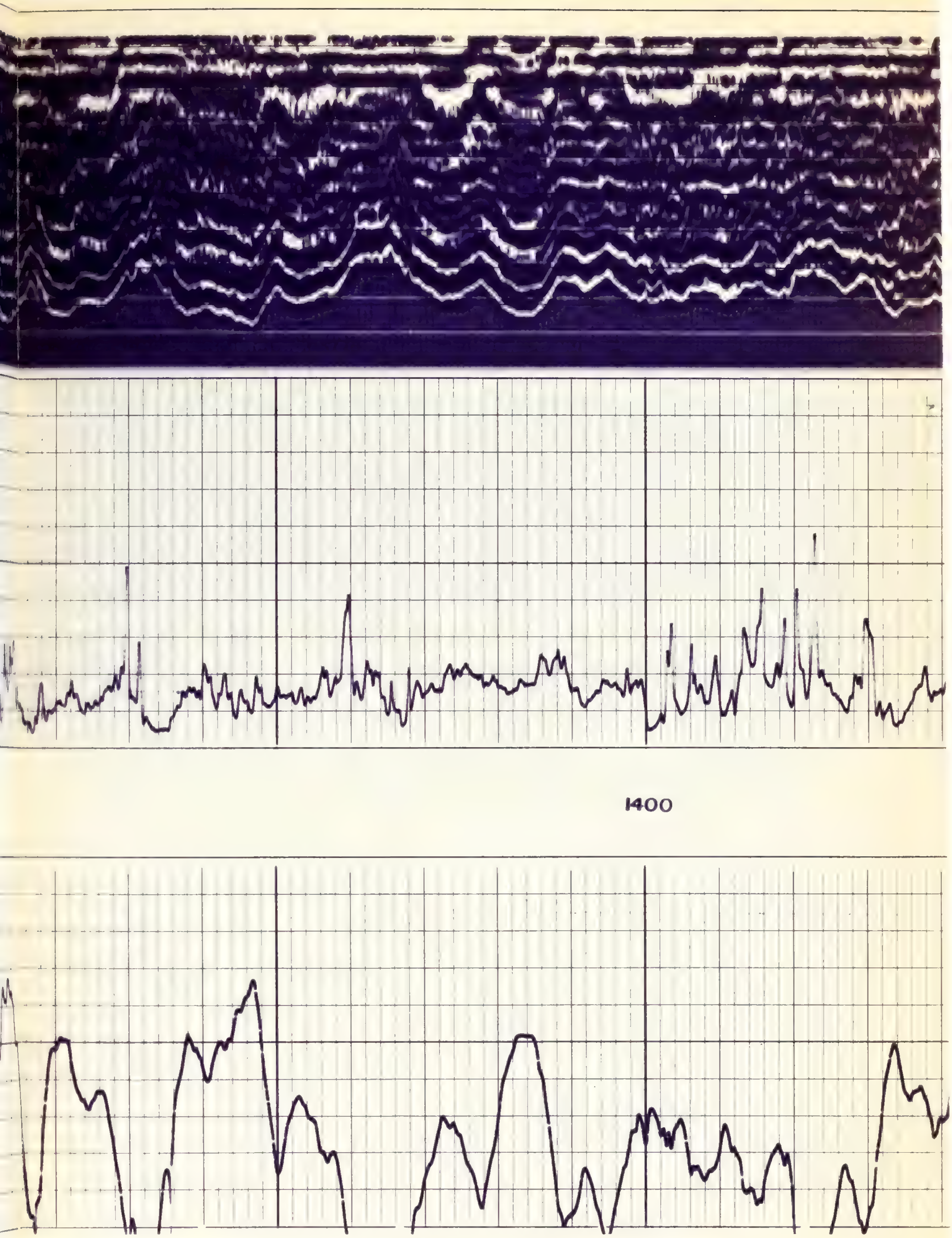

1000


1100


1200
1300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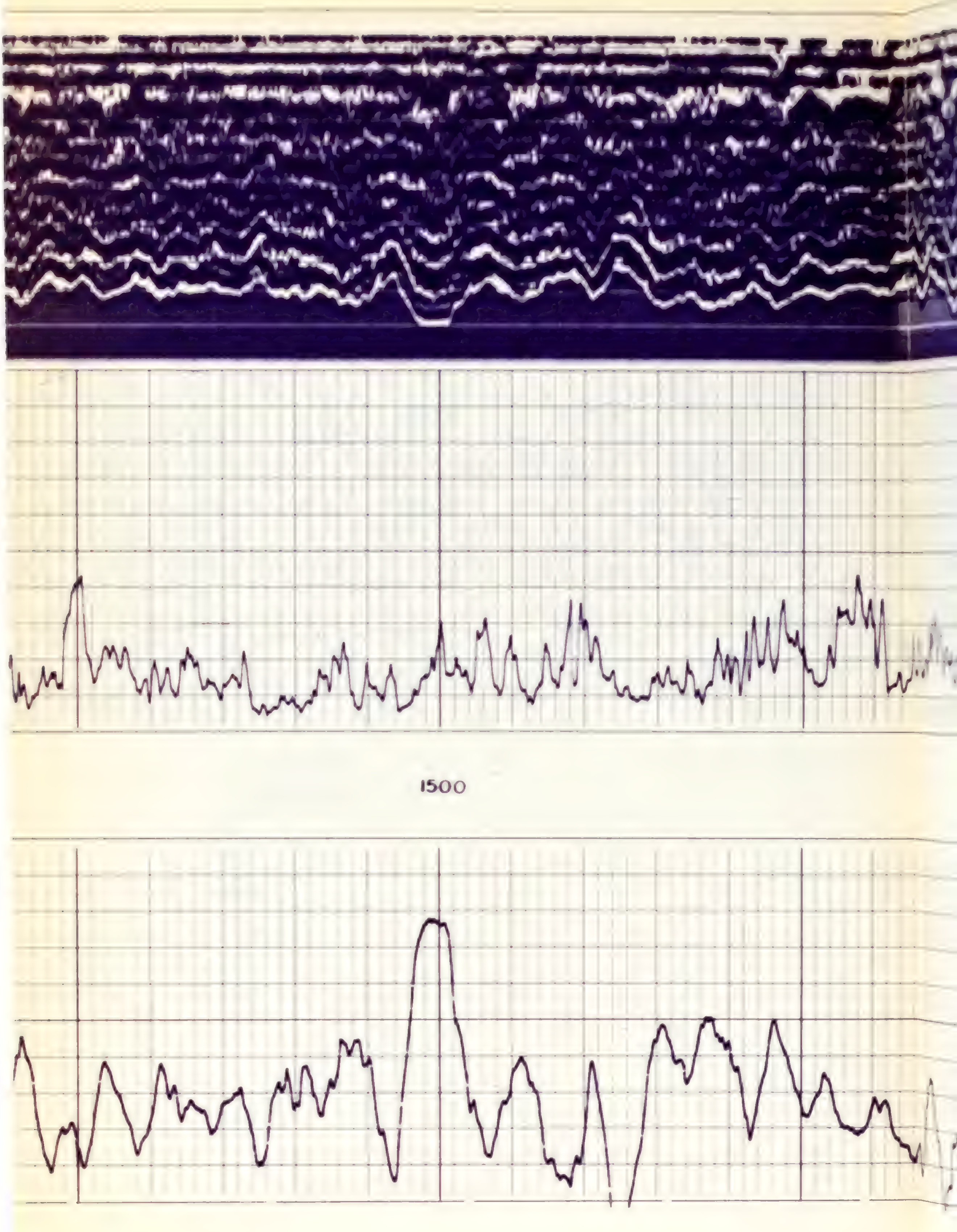
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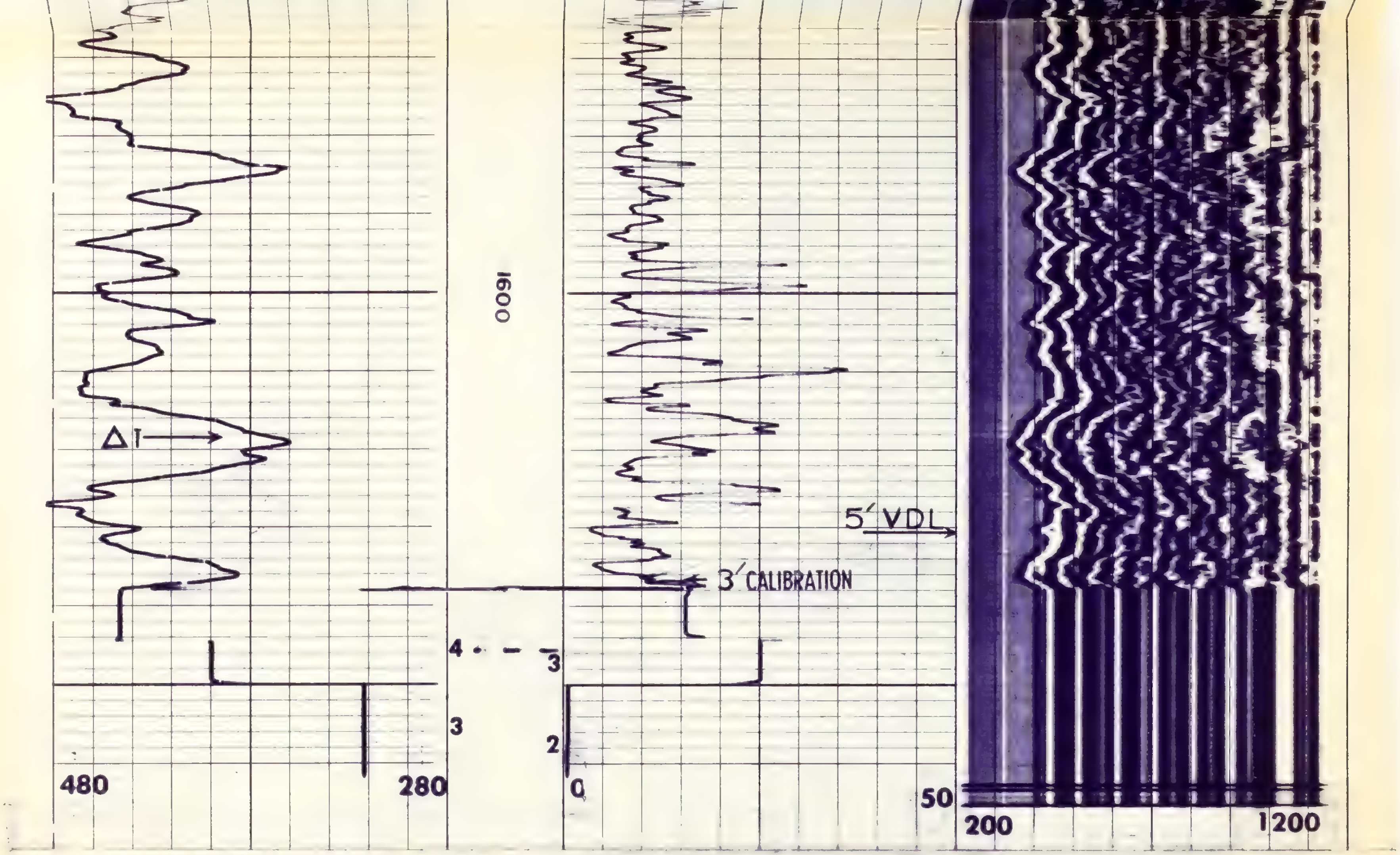
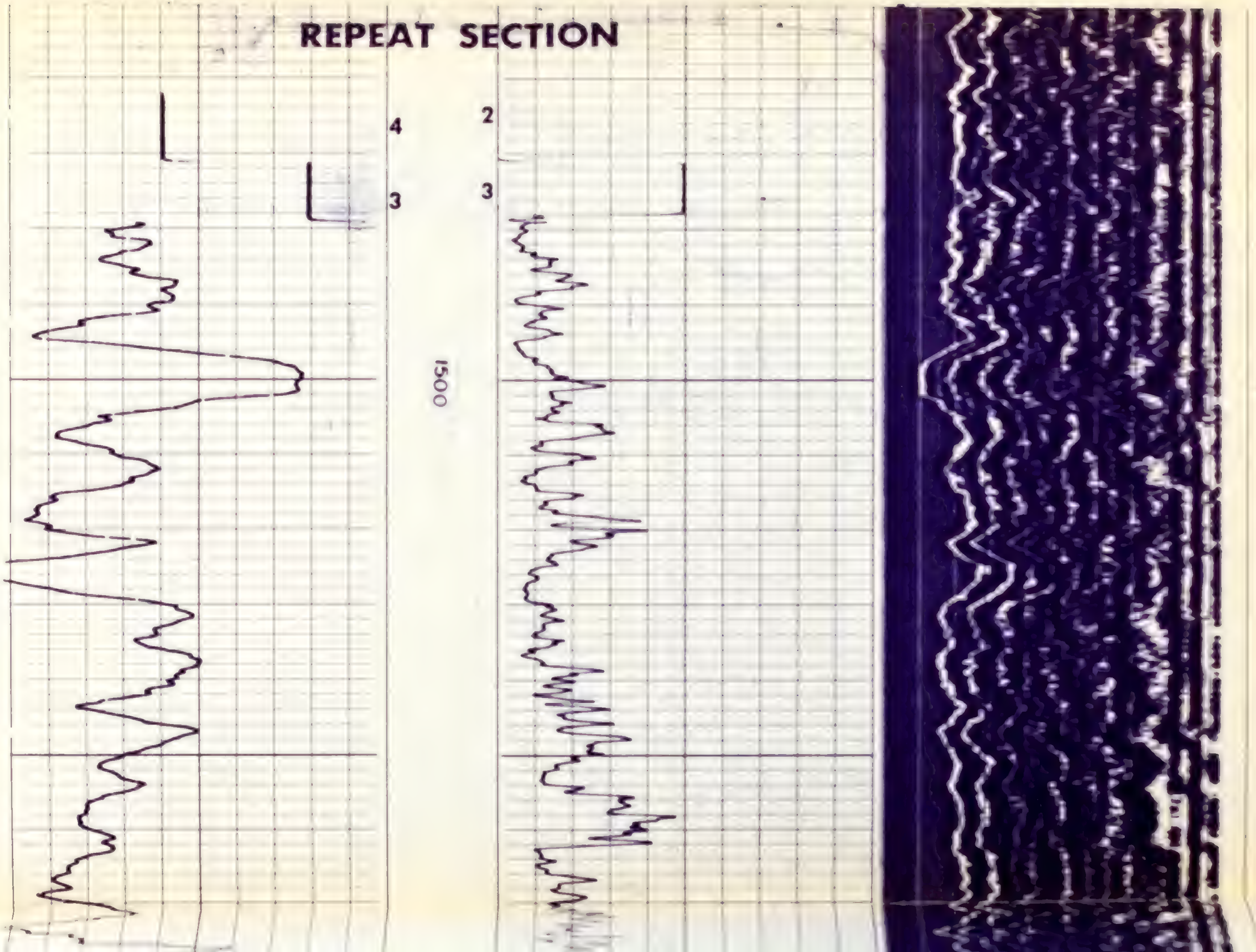
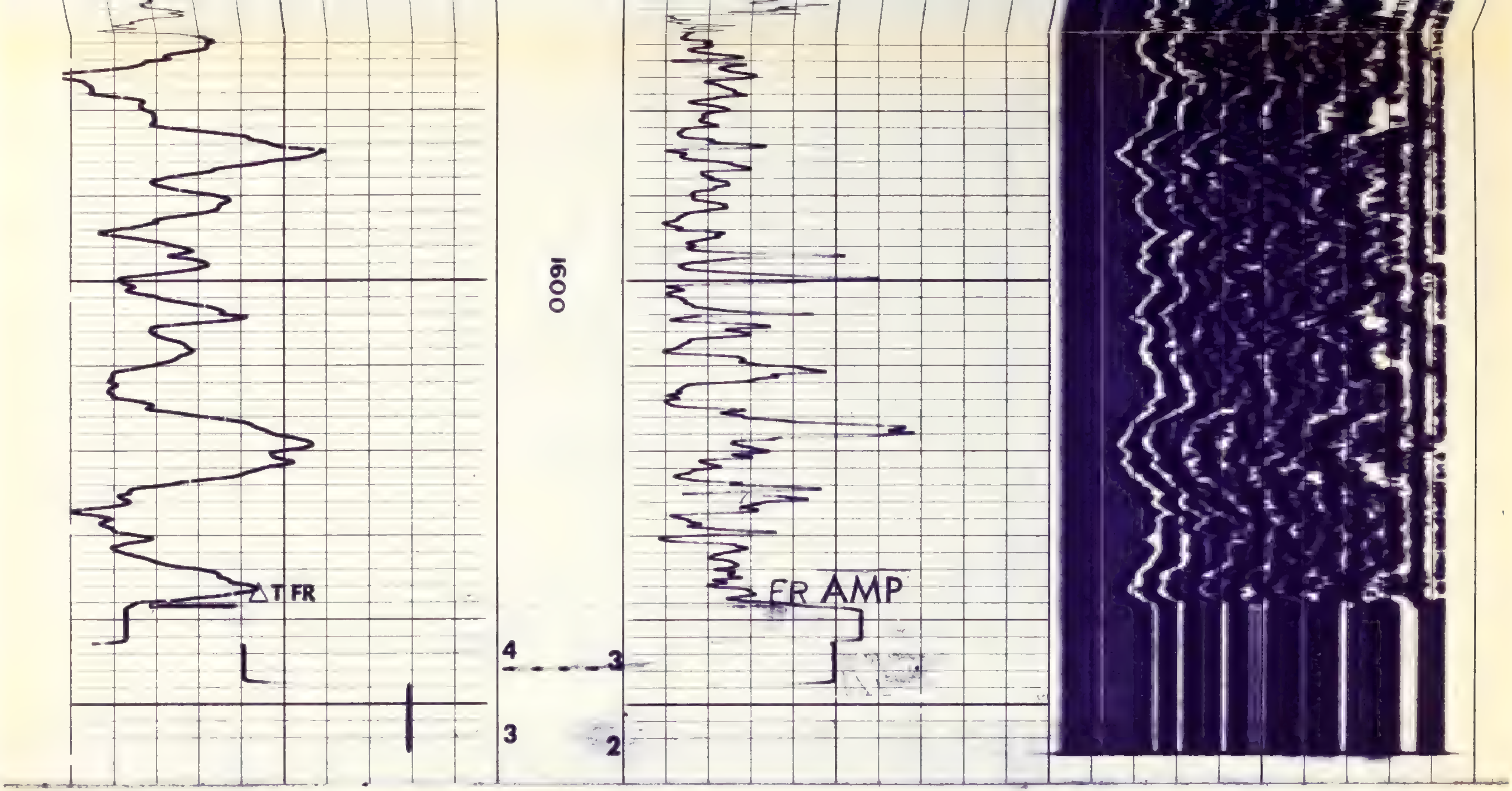

ΔT
1600
5′ VDL
3′ CALIBRATION
4
3
3
2
480
280
0
50
200
1200


REPEAT SECTION
4
3
2
3
1500



SWS 2231

SINGLE RECEIVER ΔT
microseconds
400 200

AMPLITUDE MILLIVOLTS
0 50

VARIABLE DENSITY
MICROSECONDS
5 FEET
200 1200

COMPANY ATLANTIC RICHFIELD COMPANY

SCHL. FR 1638

WELL	AT-1E	SCHL TD	----
FIELD	SORGHUM GULCH	DRLR TD	1842
		Elev: KB	----
		DF	----
COUNTY	RIO BLANCO	STATE COLORADO	GL 6313

Schlumberger

DUAL INDUCTION - LATEROLOG
WITH LINEAR CORRELATION LOG

COUNTY RIO BLANCO, COLO.
FIELD or LOCATION SORGHUM GULCH
WELL AQUIFER TEST #1-C
COMPANY ATLANTIC RICHFIELD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL AQUIFER TEST #1-C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location. API Serial No.

Sec. 7 Twp. 3-S Rge. 96-W

Other Services:
HRT
FDC-CNL-GR
BHC-GR

Permanent Datum: GL ; Elev.: 6909
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6909

Date	8/18/74			
Run No.	ONE			
Depth—Driller	1640			
Depth—Logger	1646			
Btm. Log Interval	1642			
Top Log Interval	61			
Casing—Driller	8-5/8 @ 59	@	@	@
Casing—Logger	61			
Bit Size	7-7/8			
Type Fluid in Hole	WATER			
Fluid Level	432			
Dens. | Visc.				
pH | Fluid Loss	ml	ml	ml	ml
Source of Sample				
R_m @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	6 HOURS			
Max. Rec. Temp.	86 °F	°F	°F	°F
Equip. | Location	5602 | G.J.			
Recorded By	BARGHOUTI			
Witnessed By	TAIT			

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No			
Depth - Driller				
Type Fluid in Hole				
Dens	Visc.			
ph	Fluid Loss	ml		ml
Source of Sample				
R_m @ Meas. Temp		@ °F		@ °F
R_{mf} @ Meas. Temp.		@ °F		@ °F
R_{mc} @ Meas. Temp.		@ °F		@ °F
Source: R_{mf}	R_{mc}			
R_m @ BHT		@ °F		@ °F
R_{mf} @ BHT		@ °F		@ °F
R_{mc} @ BHT		@ °F		@ °F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE			
Panel No.	CB-180			
Cart. No.	B-163			
Sonde No.	DB-49			
Mem. Panel No.	B-238			
G.R. Cart No				
G.R. Panel No				
TTR No				
Cent. Device	RUBBER			
Stand off - Inches	± 1-1/2			
Time Const. - Sec.				
Speed - F.P.M.	70			

REMARKS

Service Order No. - 15129

TOP ELETRODE OUT OF FLUID

NOTE POOR REPEAT SECTION

☐ Surface determined sonde errors used for 6FF40.

☐ 6FF40 sonde error corrected for inch borehole signal at R_m =

☒ 6FF40 zero set in hole at depth of 1200 feet

CALIBRATION DATA

CALIBRATION DATA

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.	
GAMMA RAY:							

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SPONTANEOUS-POTENTIAL

MILLIVOLTS

– 10 MV +

CONDUCTIVITY

MILLIMHOS/M = $\frac{1000}{\text{OHMS. M}^2/\text{M}}$

DEEP INDUCTION LOG

400 200 0

RESISTIVITY

OHMS. M^2/M

DEEP INDUCTION LOG

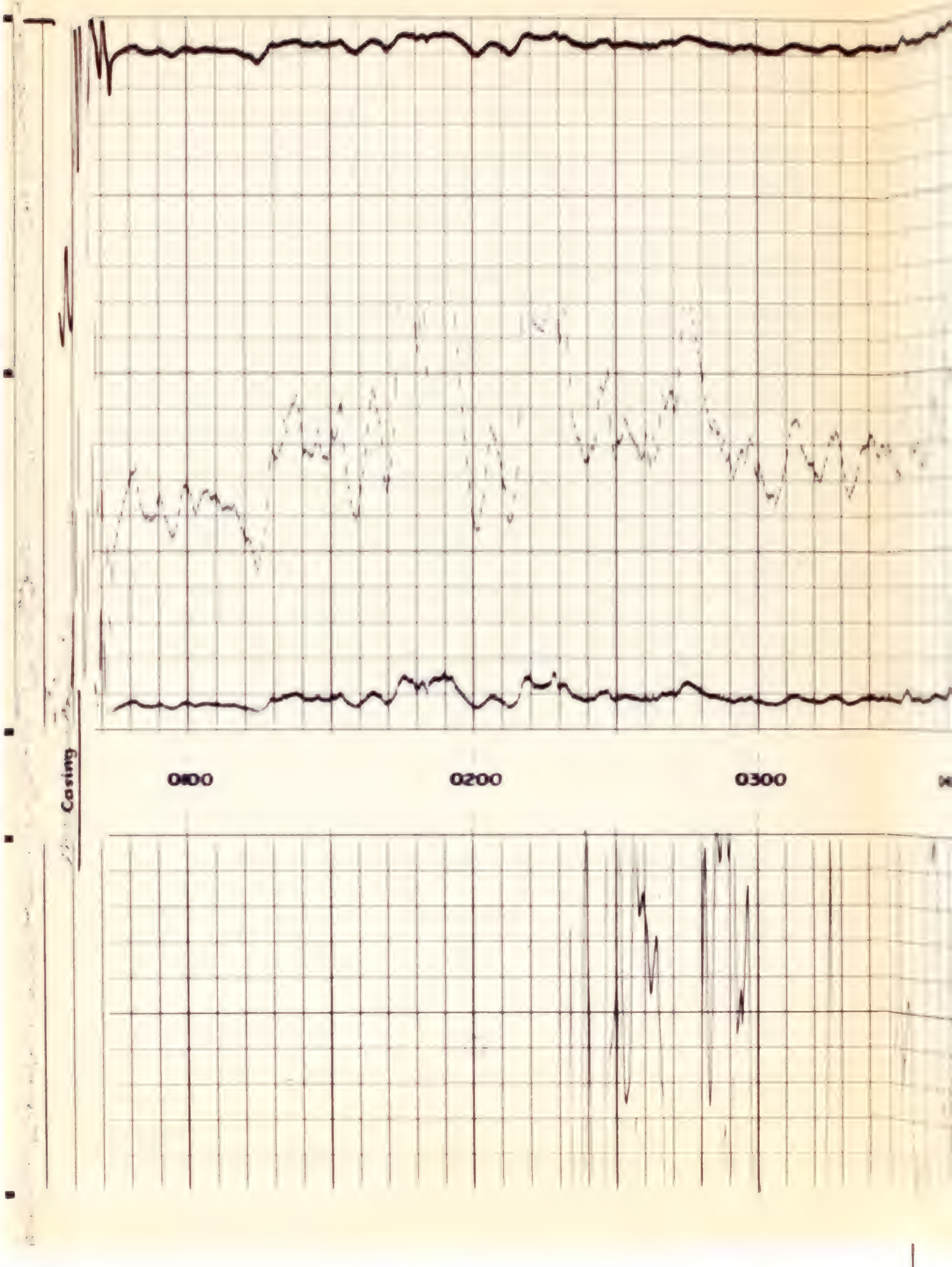
0 100

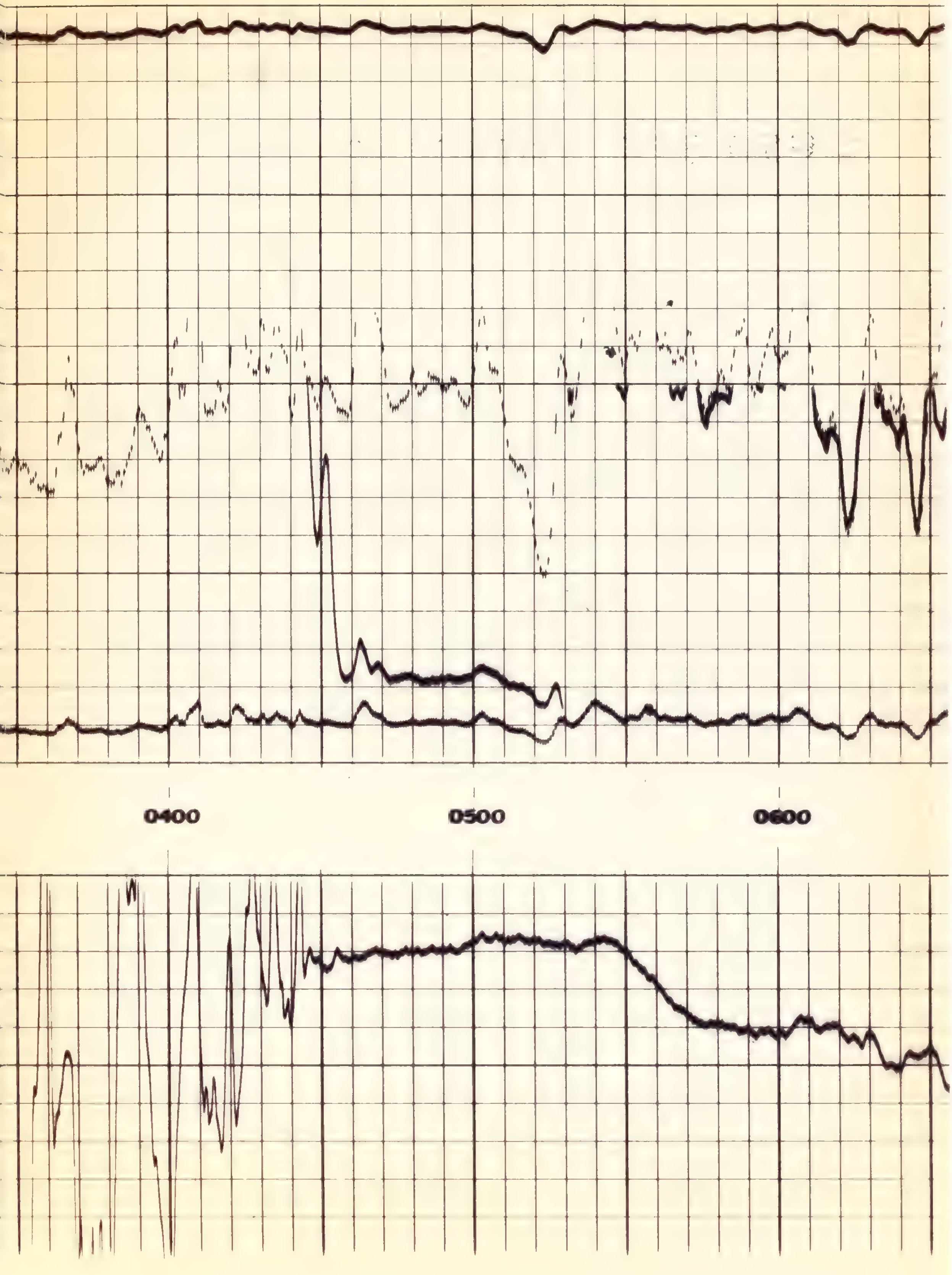
0 1000

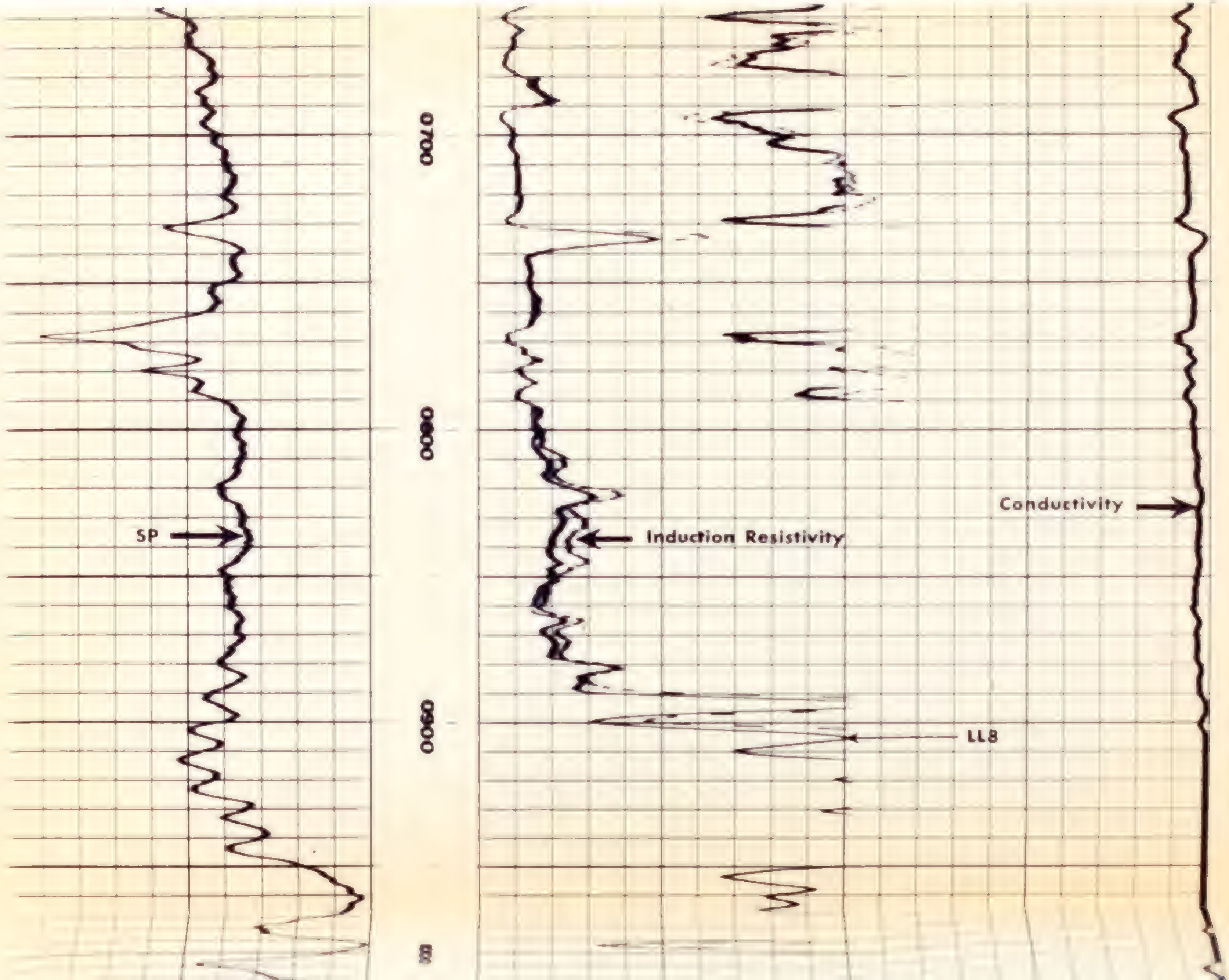
AVERAGED LATEROLOG - 8

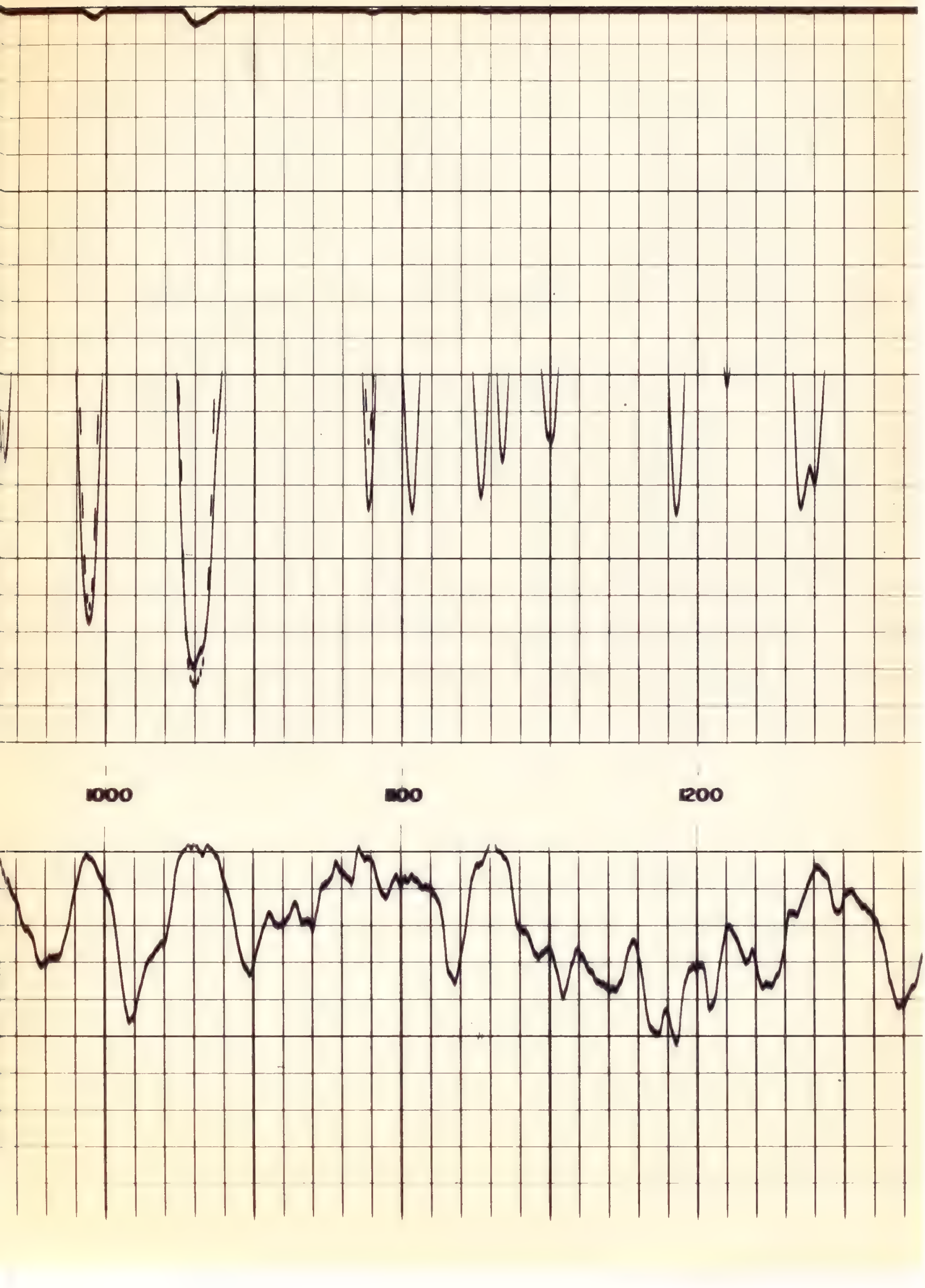
0 100

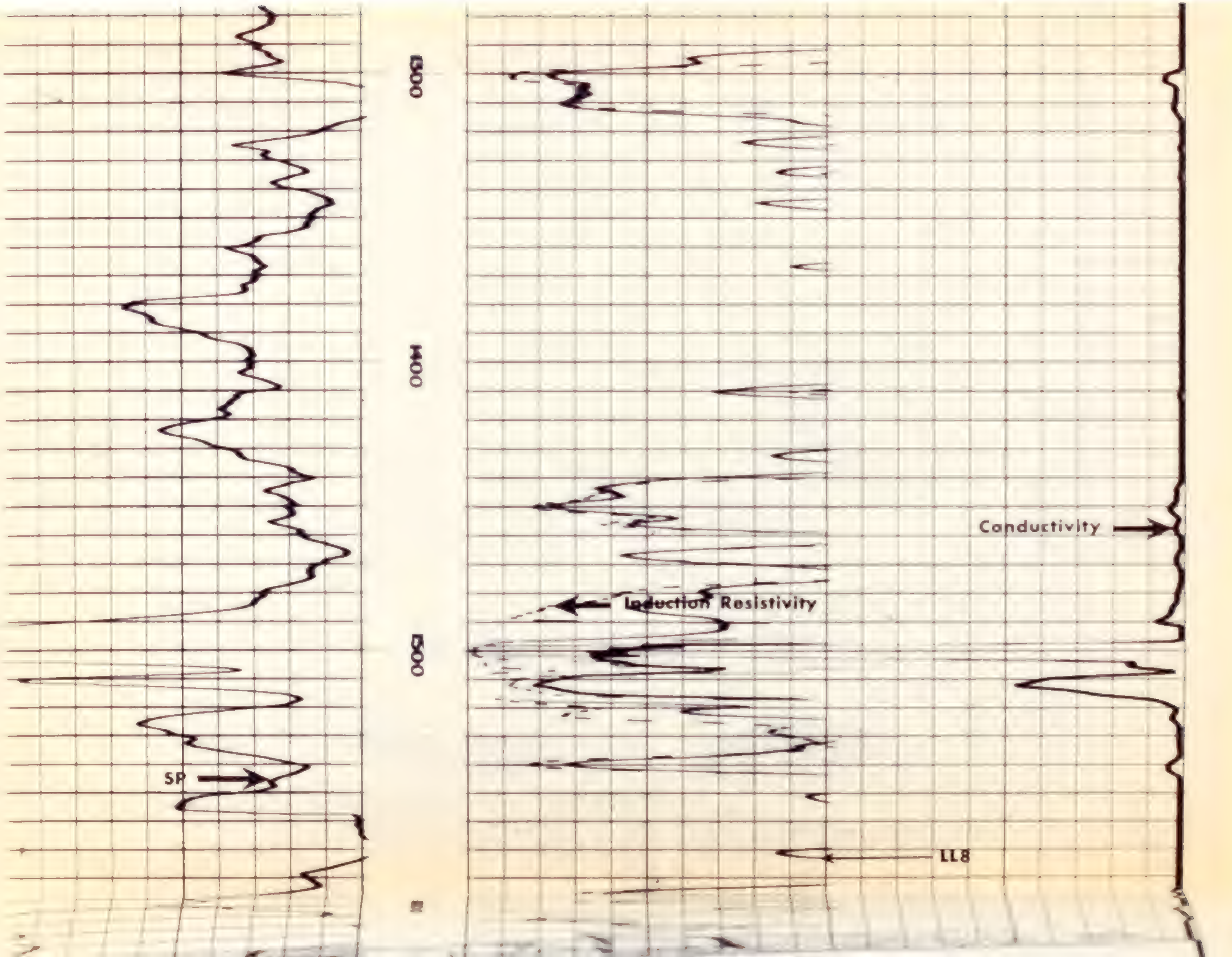
0 1000

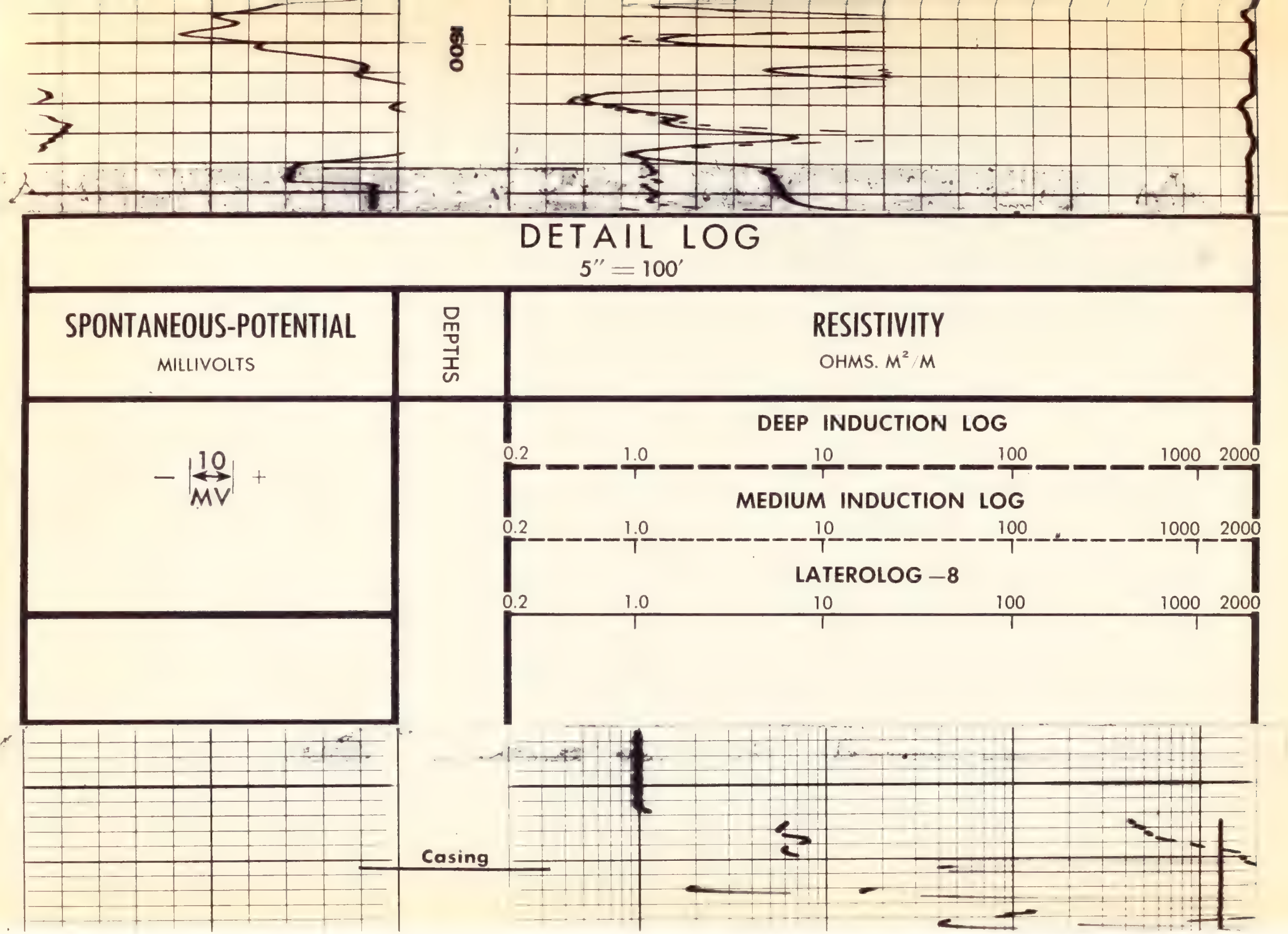

Casing
0100
0200
0300

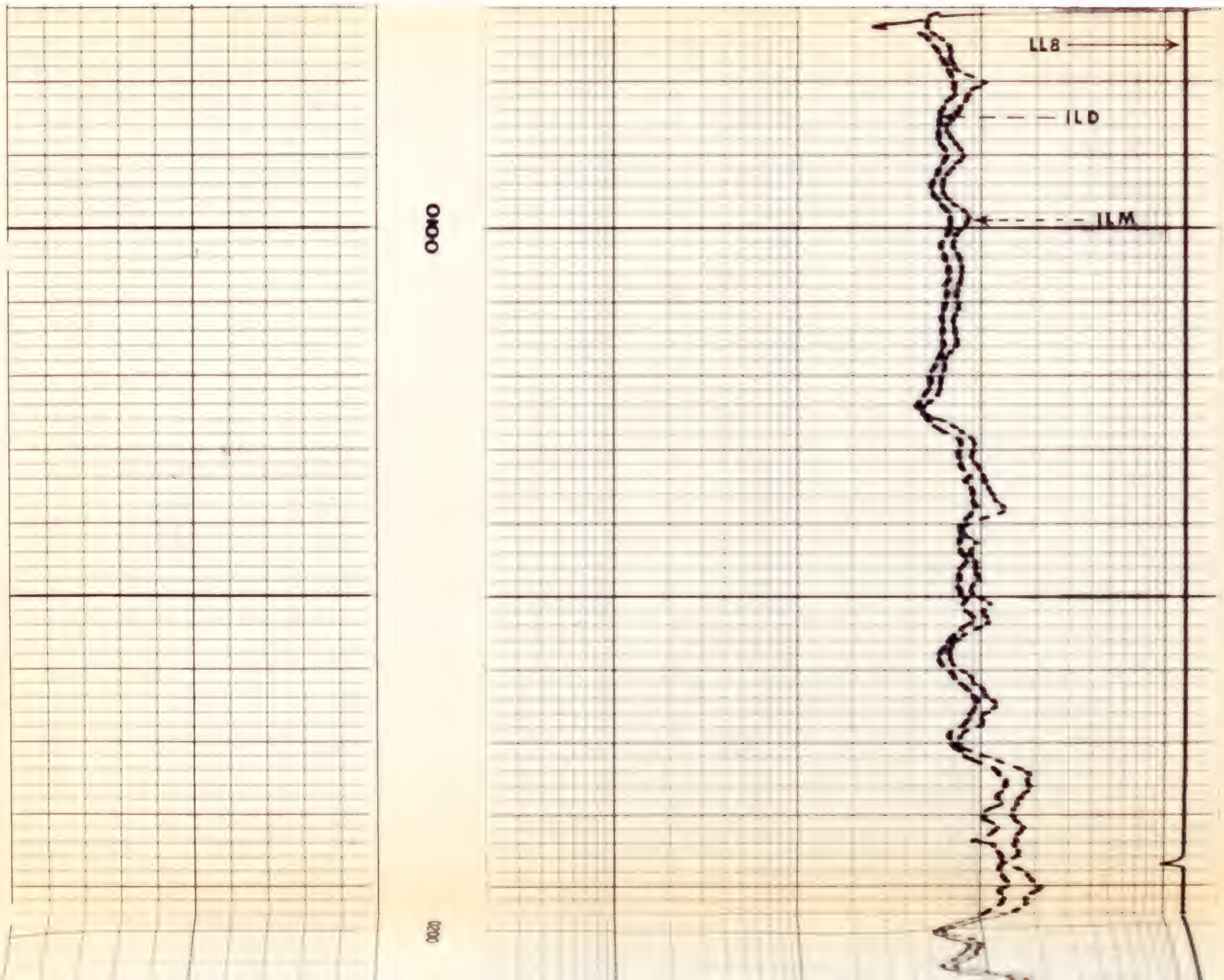

0400
0500
0600

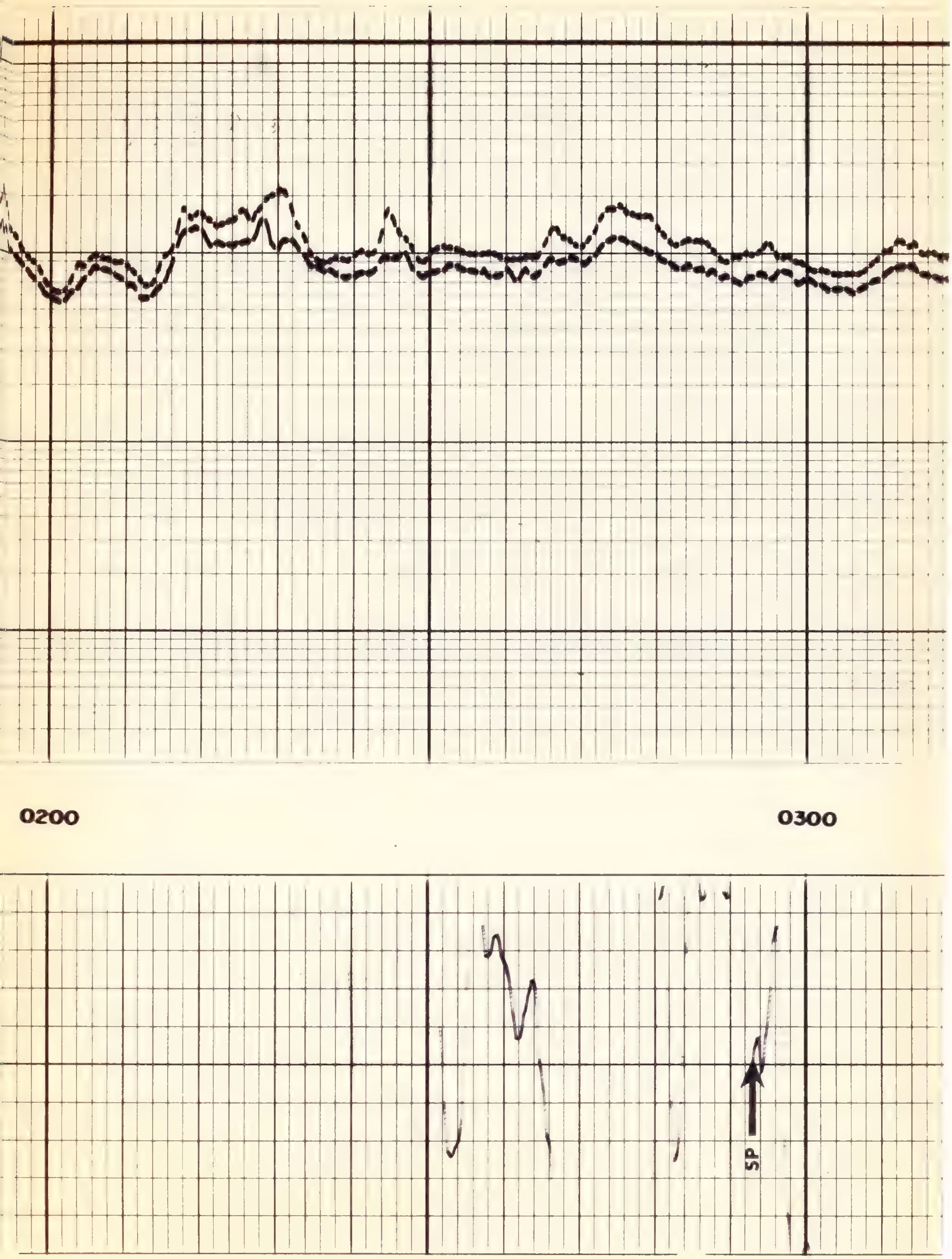

0700
0800
0900
Conductivity
Induction Resistivity
SP
LL8

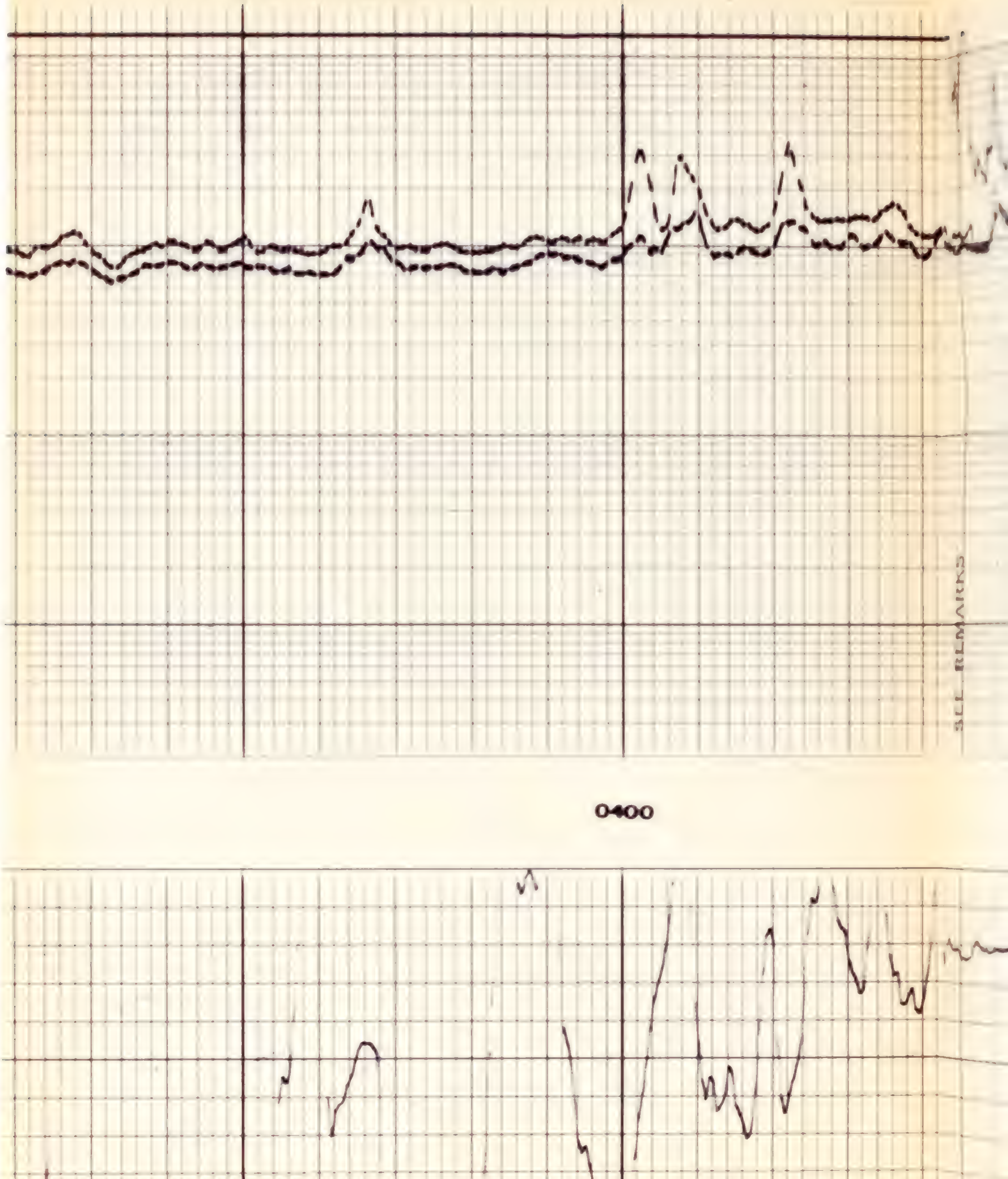

1000
1100
1200

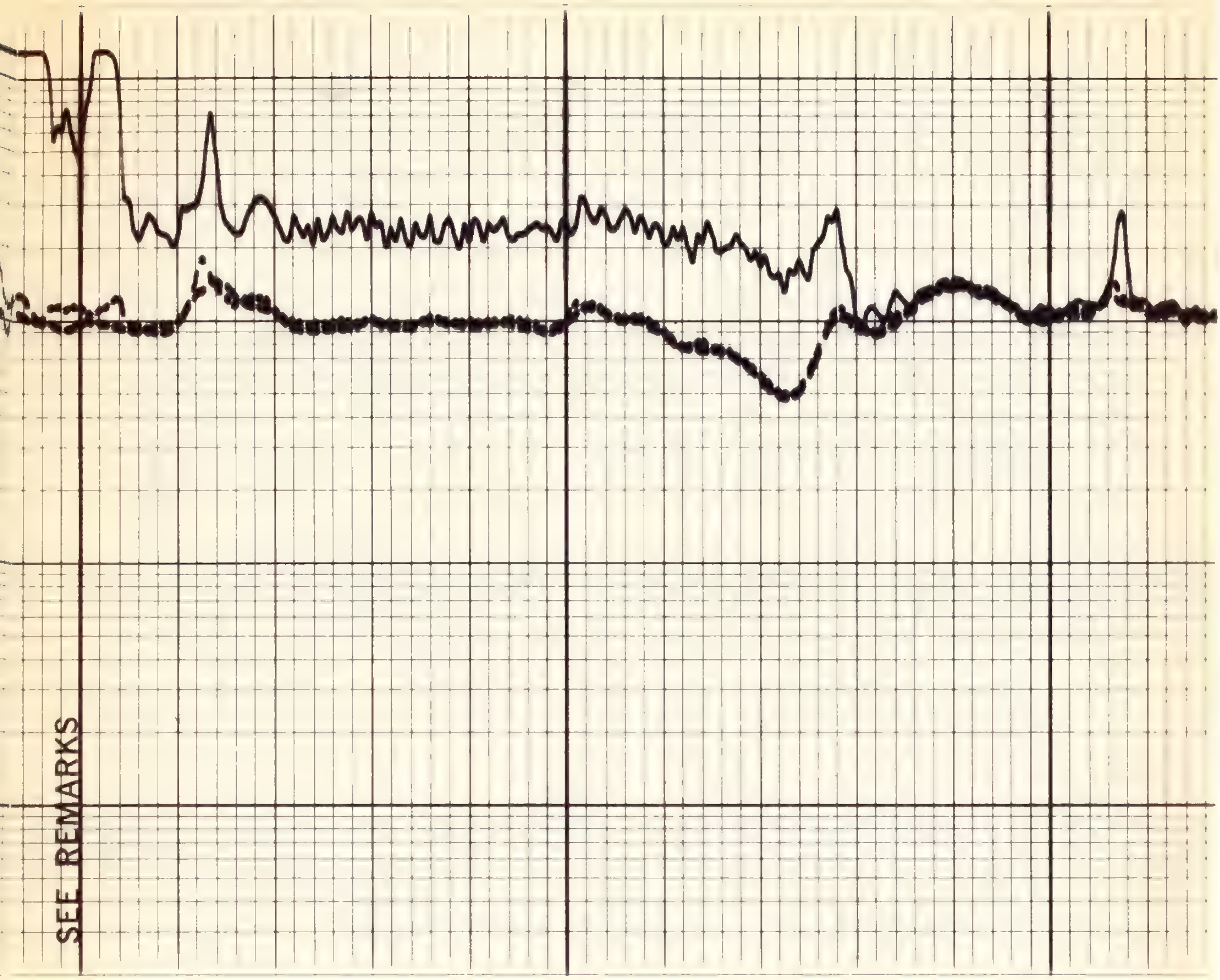

1300
1400
1500
SP
Induction Resistivity
LL8
Conductivity


DETAIL LOG
5″ = 100′
SPONTANEOUS-POTENTIAL
MILLIVOLTS
— 10 MV +
DEPTHS
RESISTIVITY
OHMS. M²/M
DEEP INDUCTION LOG
0.2 1.0 10 100 1000 2000
MEDIUM INDUCTION LOG
0.2 1.0 10 100 1000 2000
LATEROLOG —8
0.2 1.0 10 100 1000 2000
1600
Casing


LL8
ILD
ILM
0100
0200


0200
0300
SP


SEE REMARKS
0400



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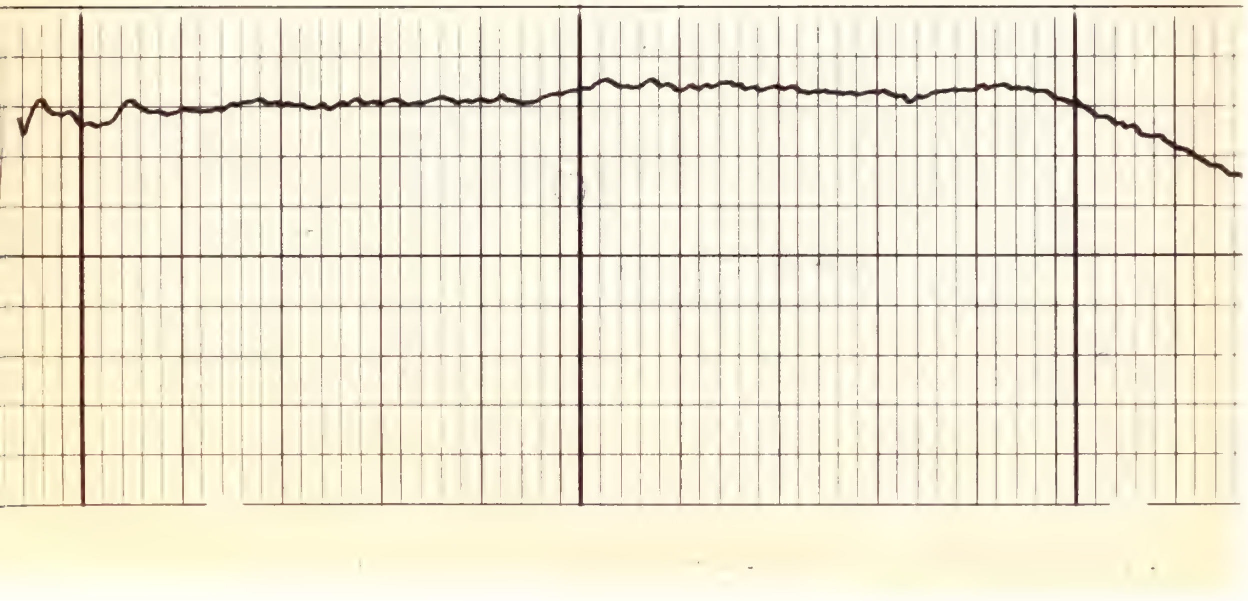

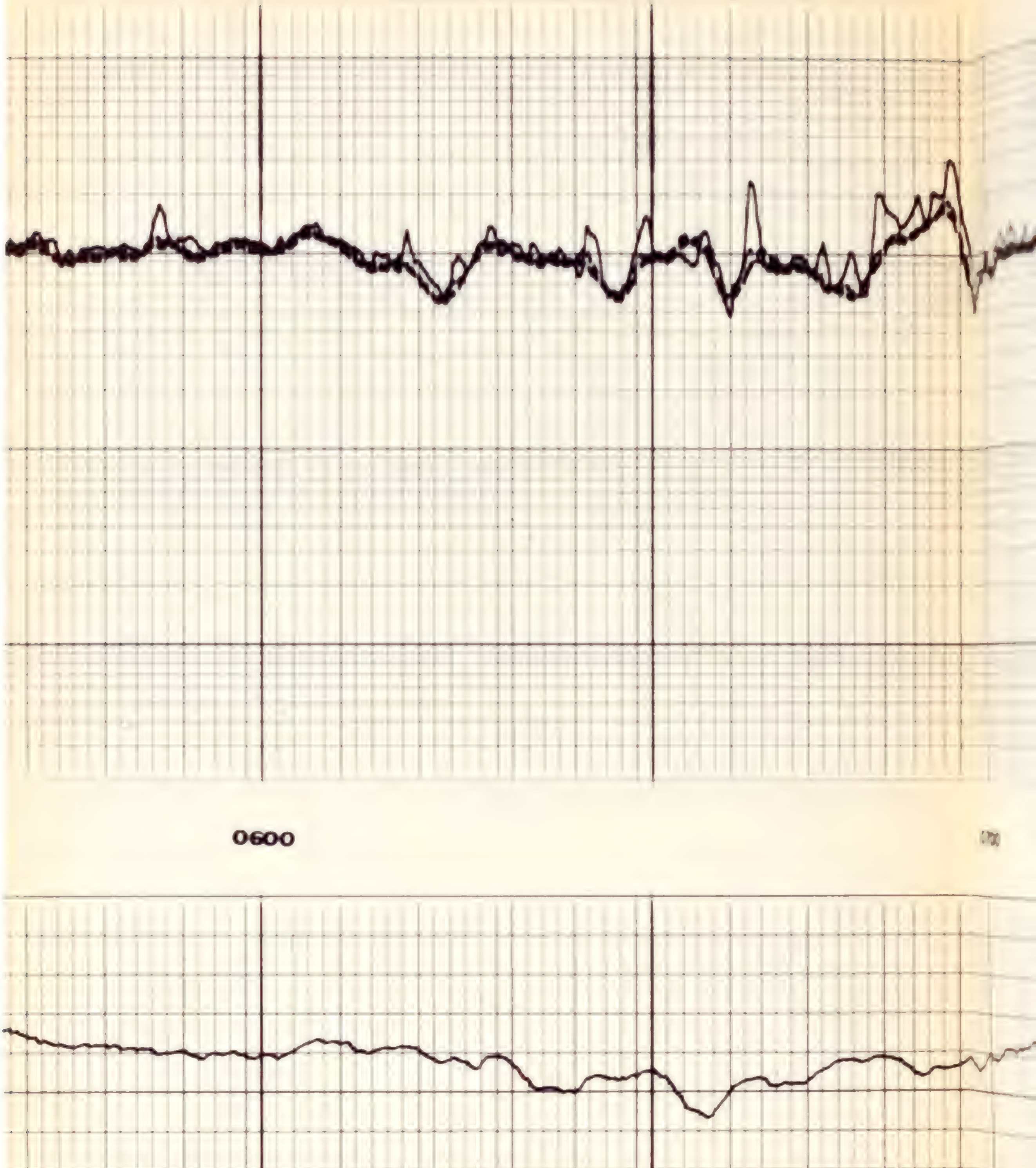
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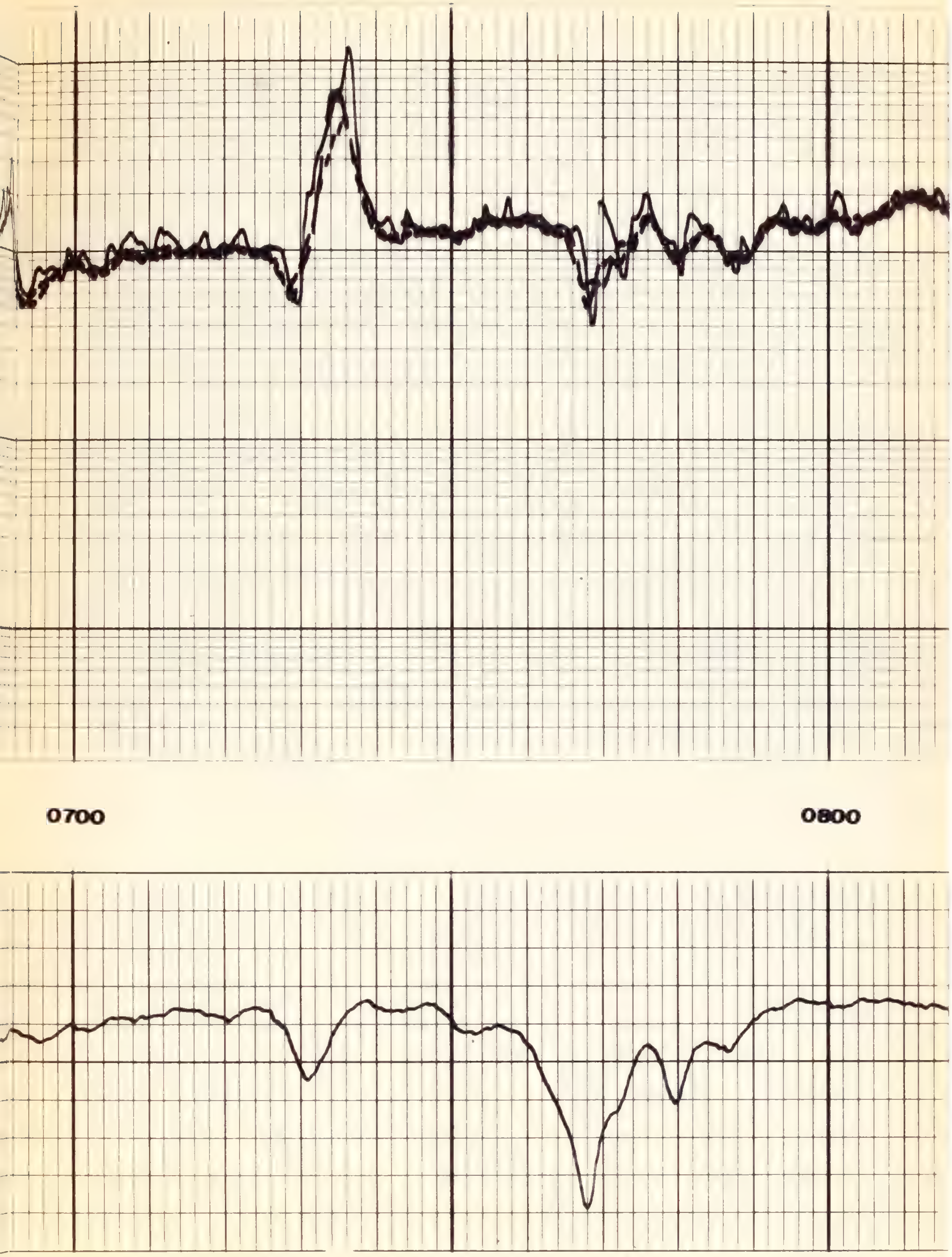
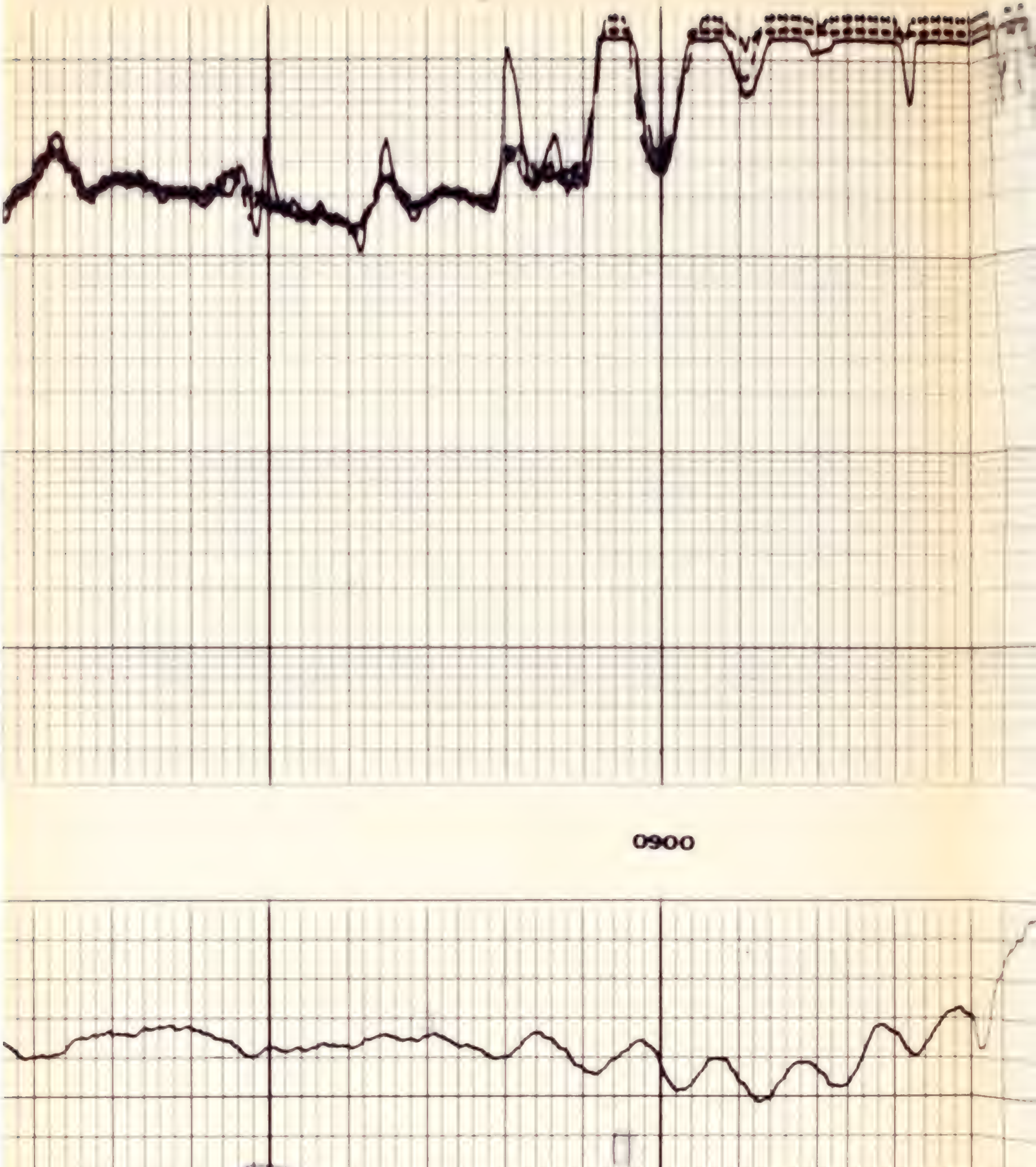

0700
0800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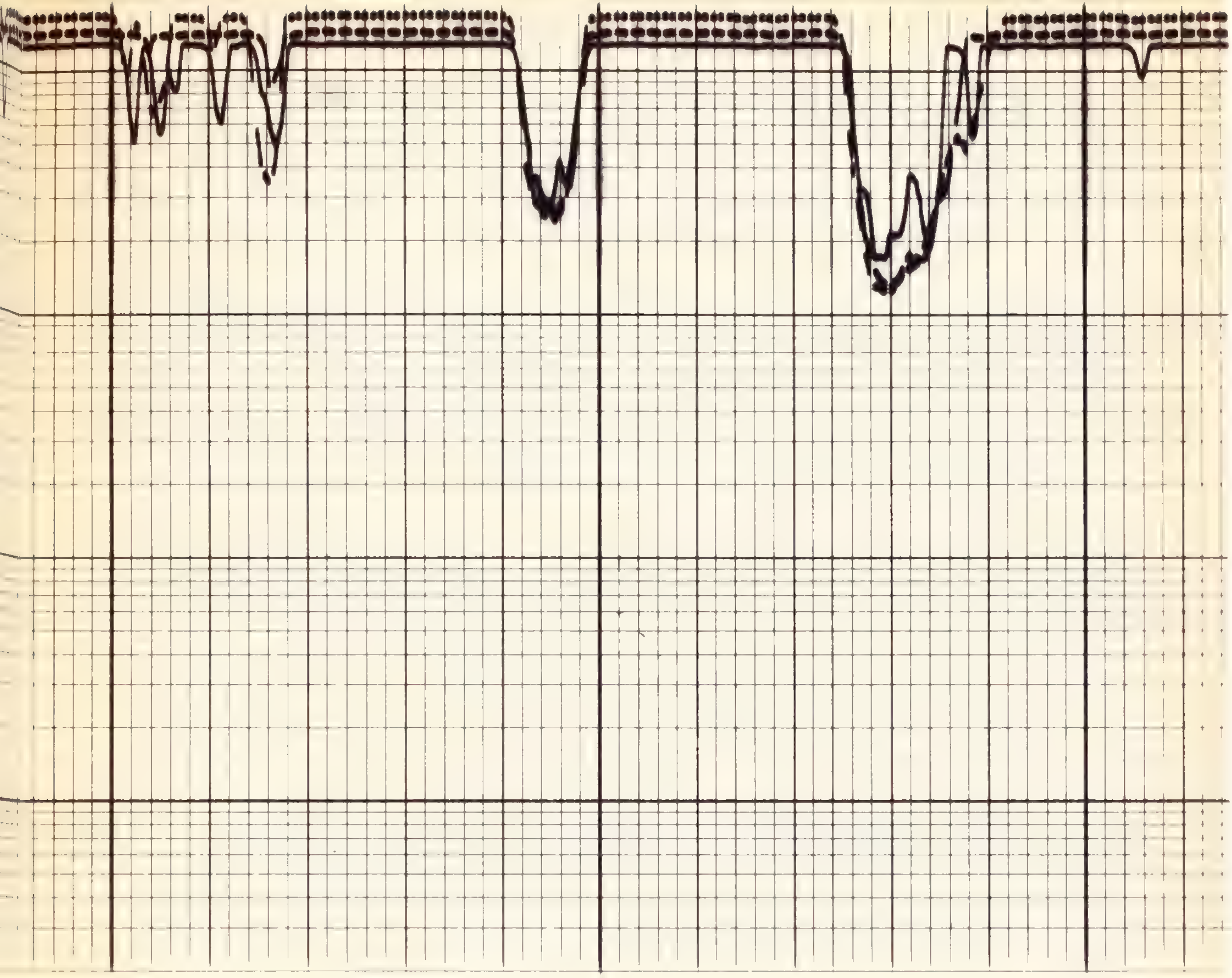

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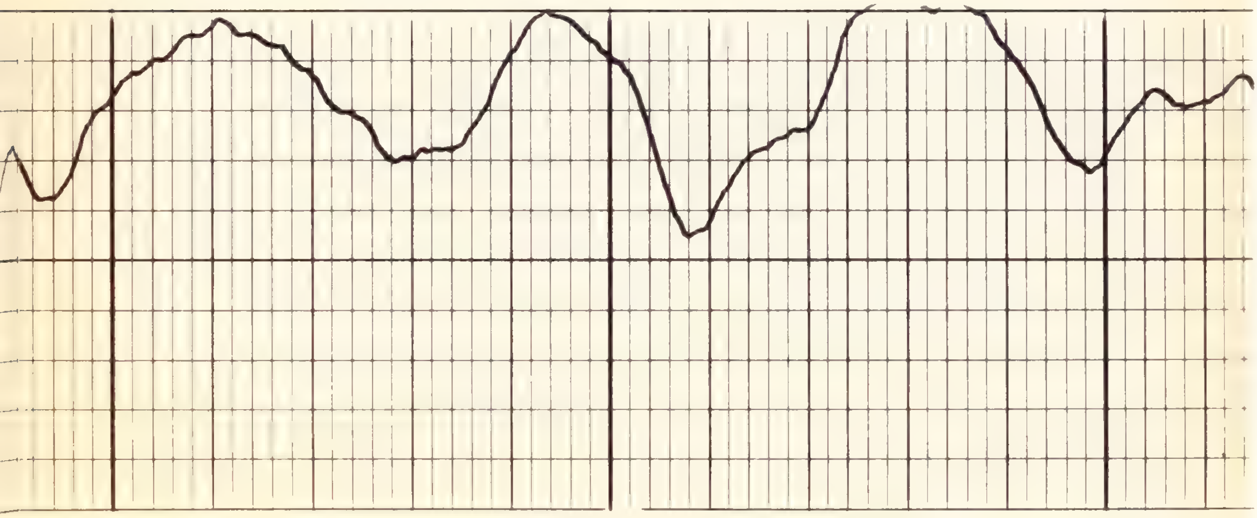
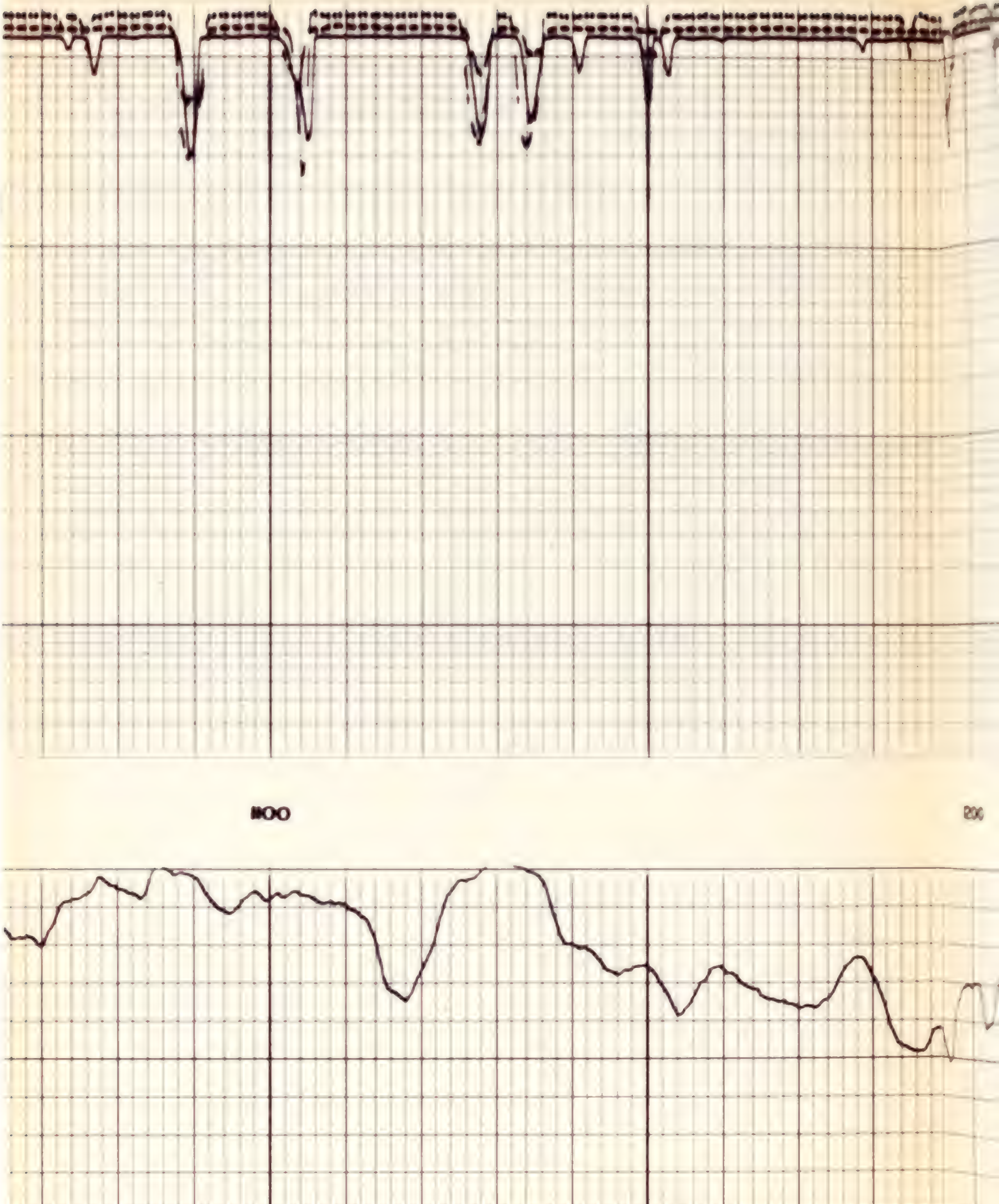
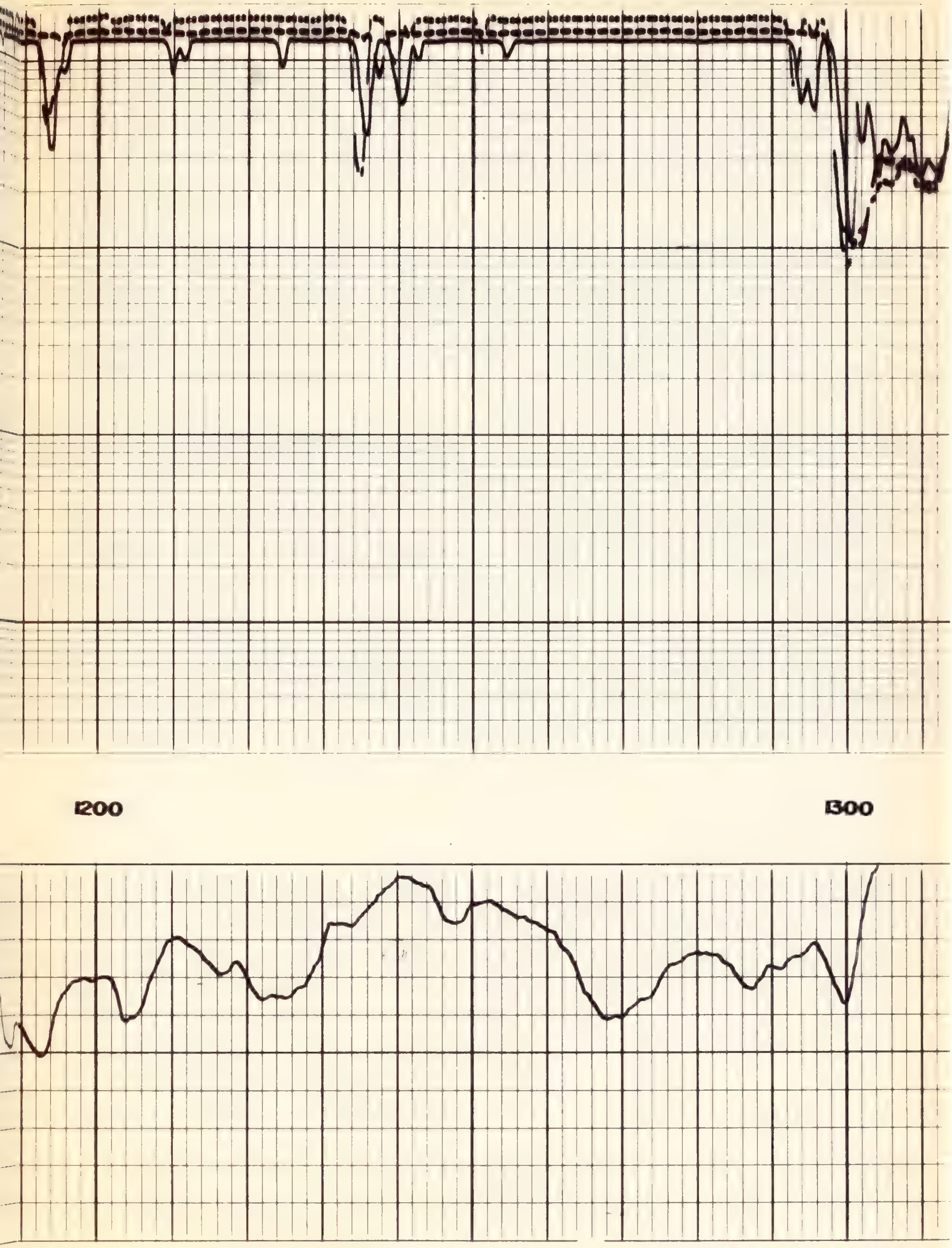
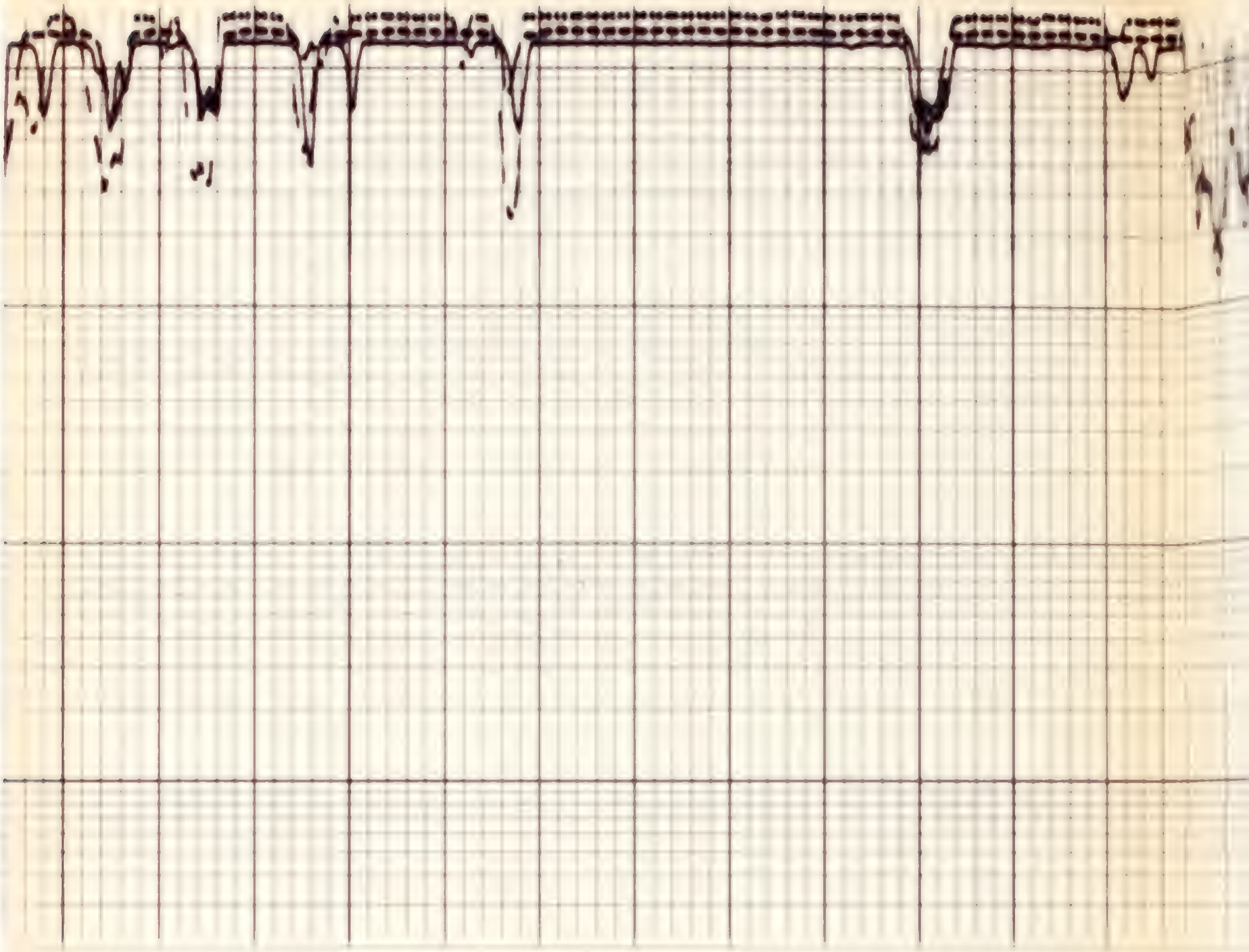



1100
200


1200
1300



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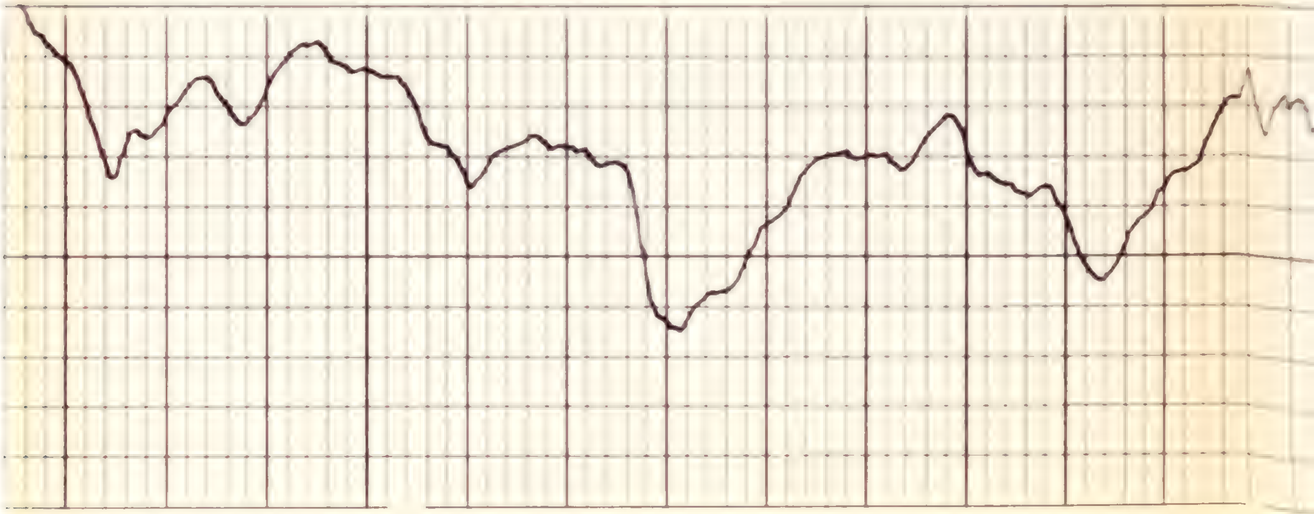
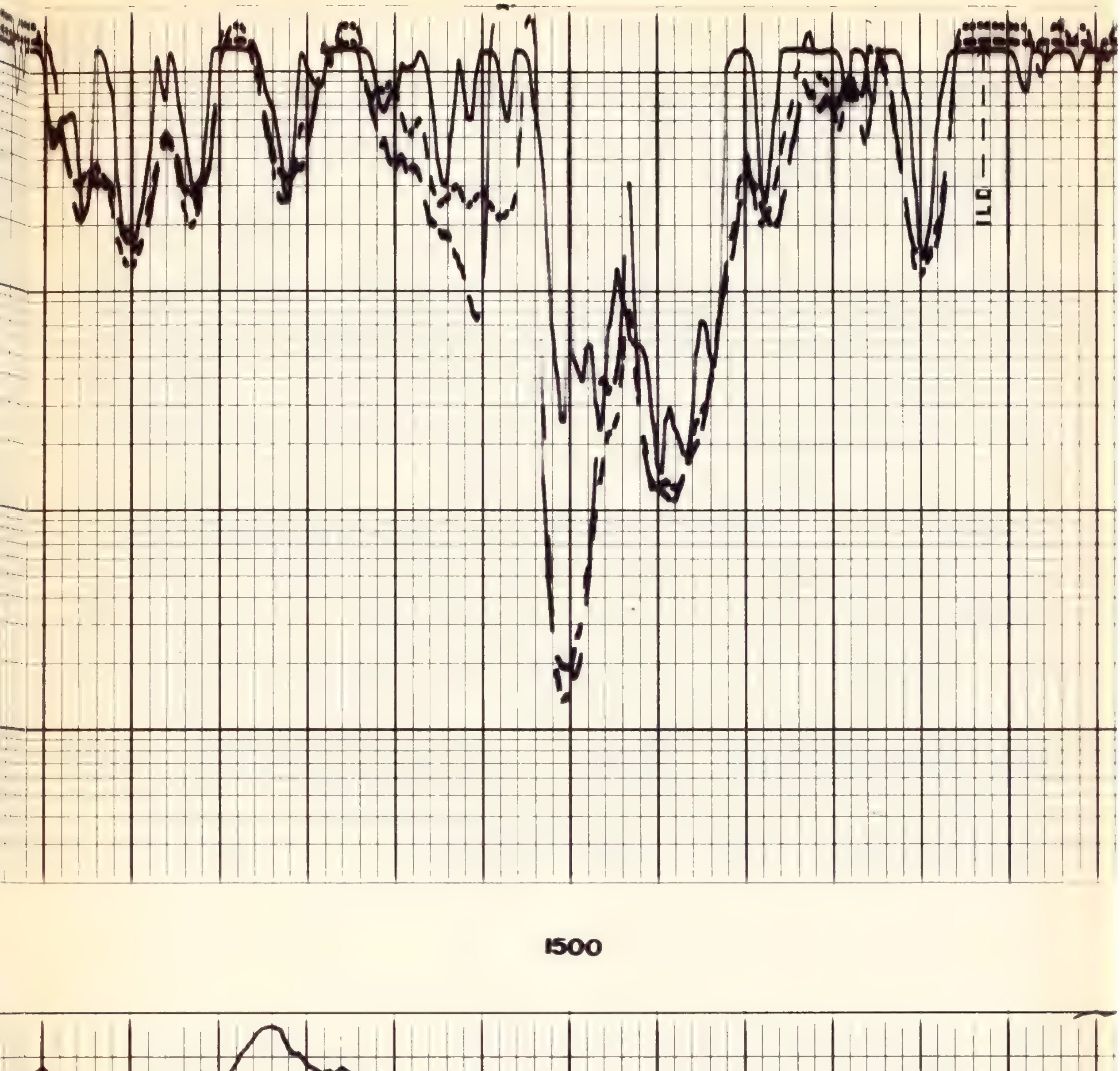
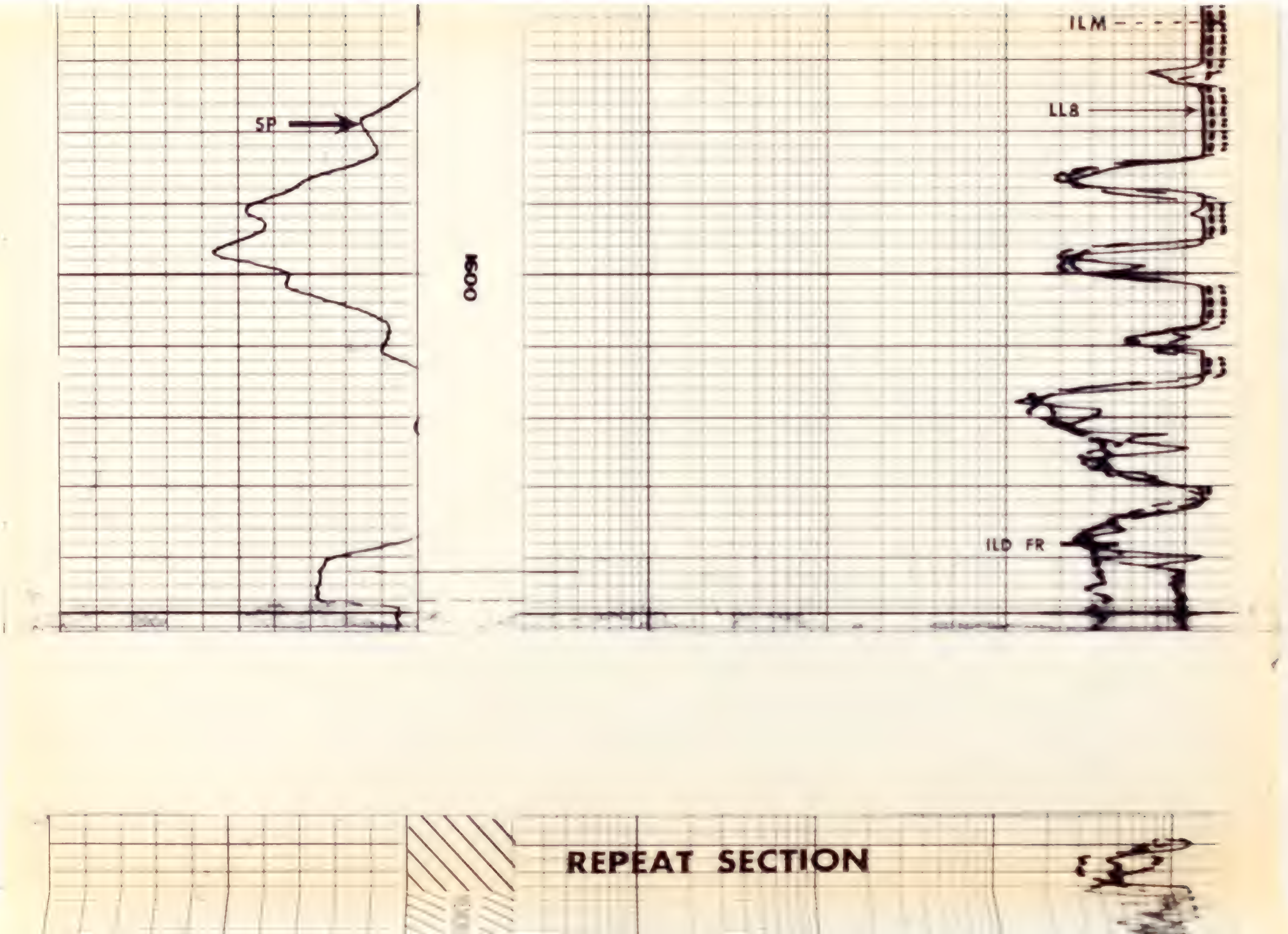
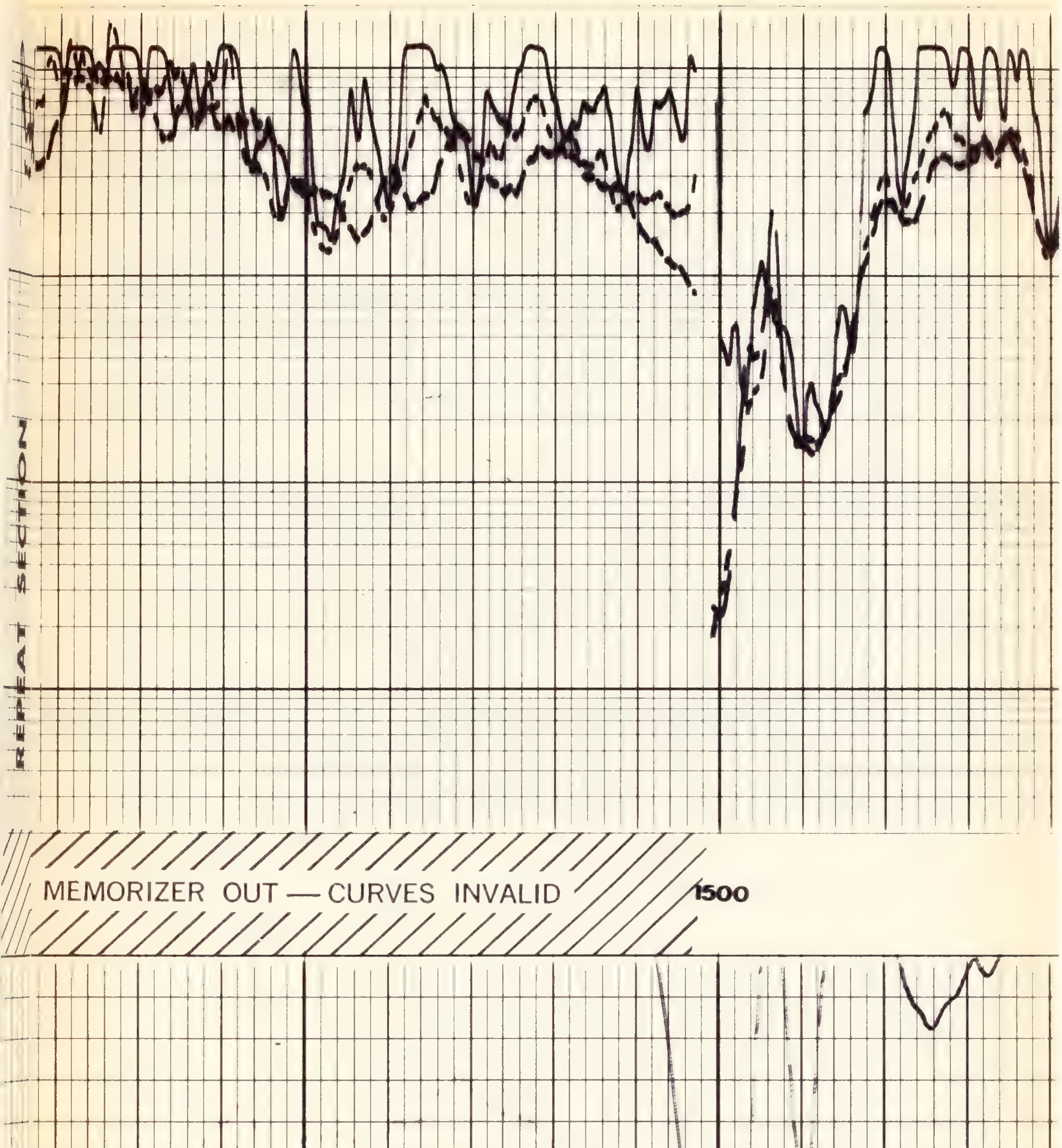
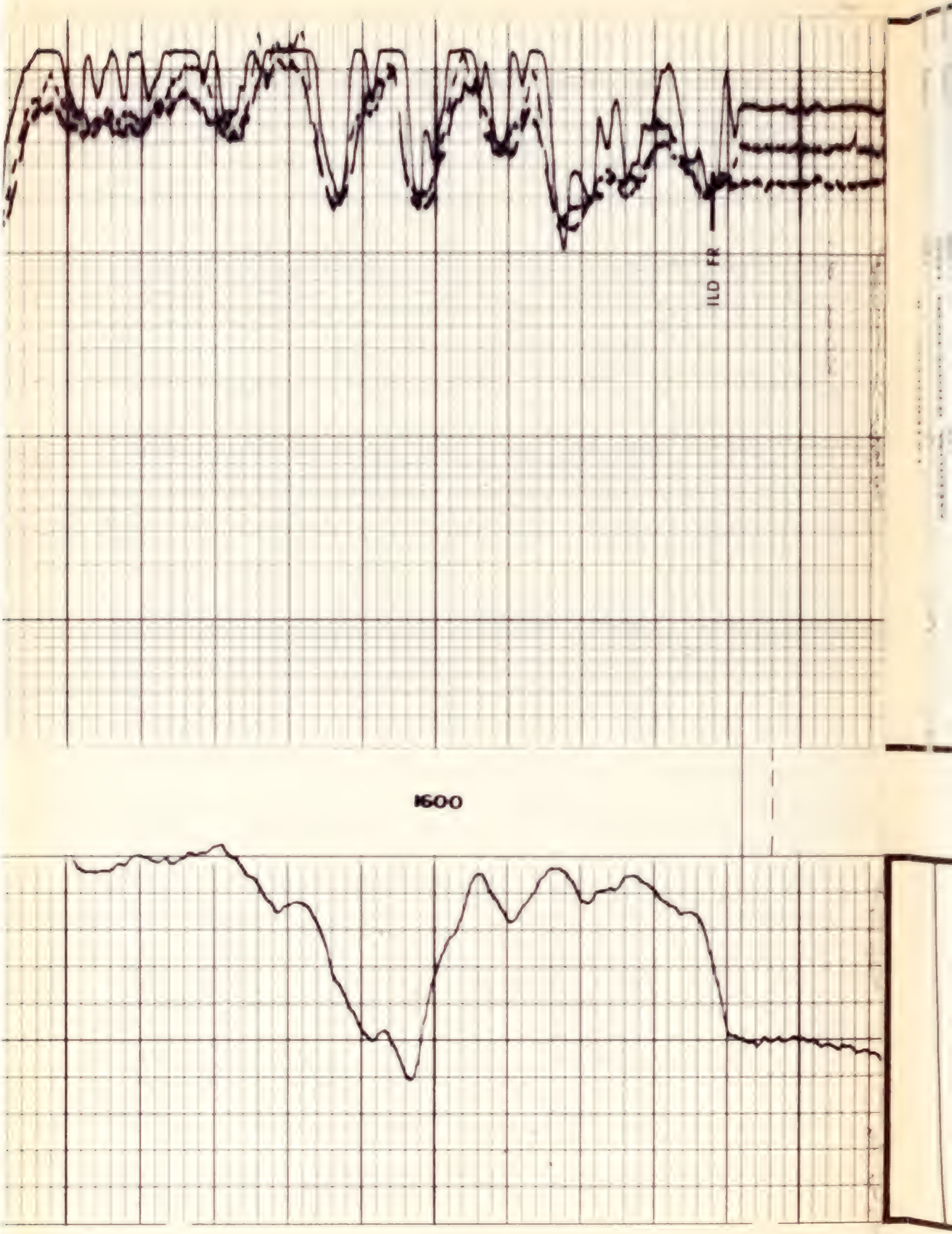



11.0
1500


ILM
LL8
SP
1600
ILD FR
REPEAT SECTION


REPEAT SECTION
MEMORIZER OUT — CURVES INVALID
1500


ILD FR
1600

— 10 MV +

LATEROLOG — 8

0.2 1.0 10 100 1000 2000

MEDIUM INDUCTION LOG

0.2 1.0 10 100 1000 2000

DEEP INDUCTION LOG

0.2 1.0 10 100 1000 2000

SPONTANEOUS-POTENTIAL

MILLIVOLTS

DEPTHS

RESISTIVITY

OHMS. M^2/M

COMPANY THE ATLANTIC RICHFIELD COMPANY

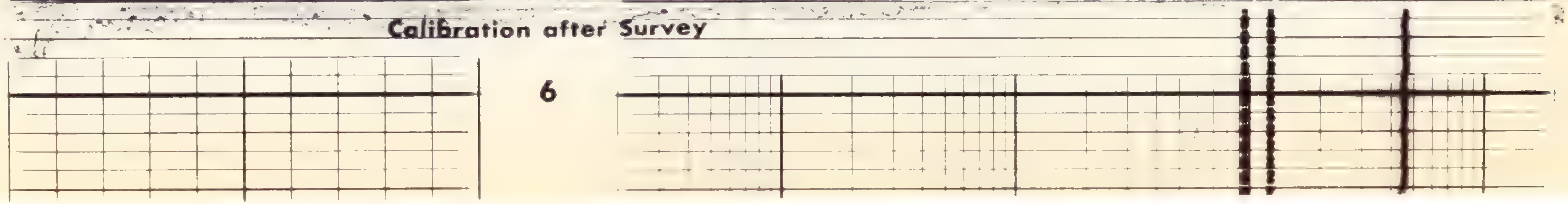
WELL AQUIFER TEST #1-C

FIELD SORGHUM GULCH

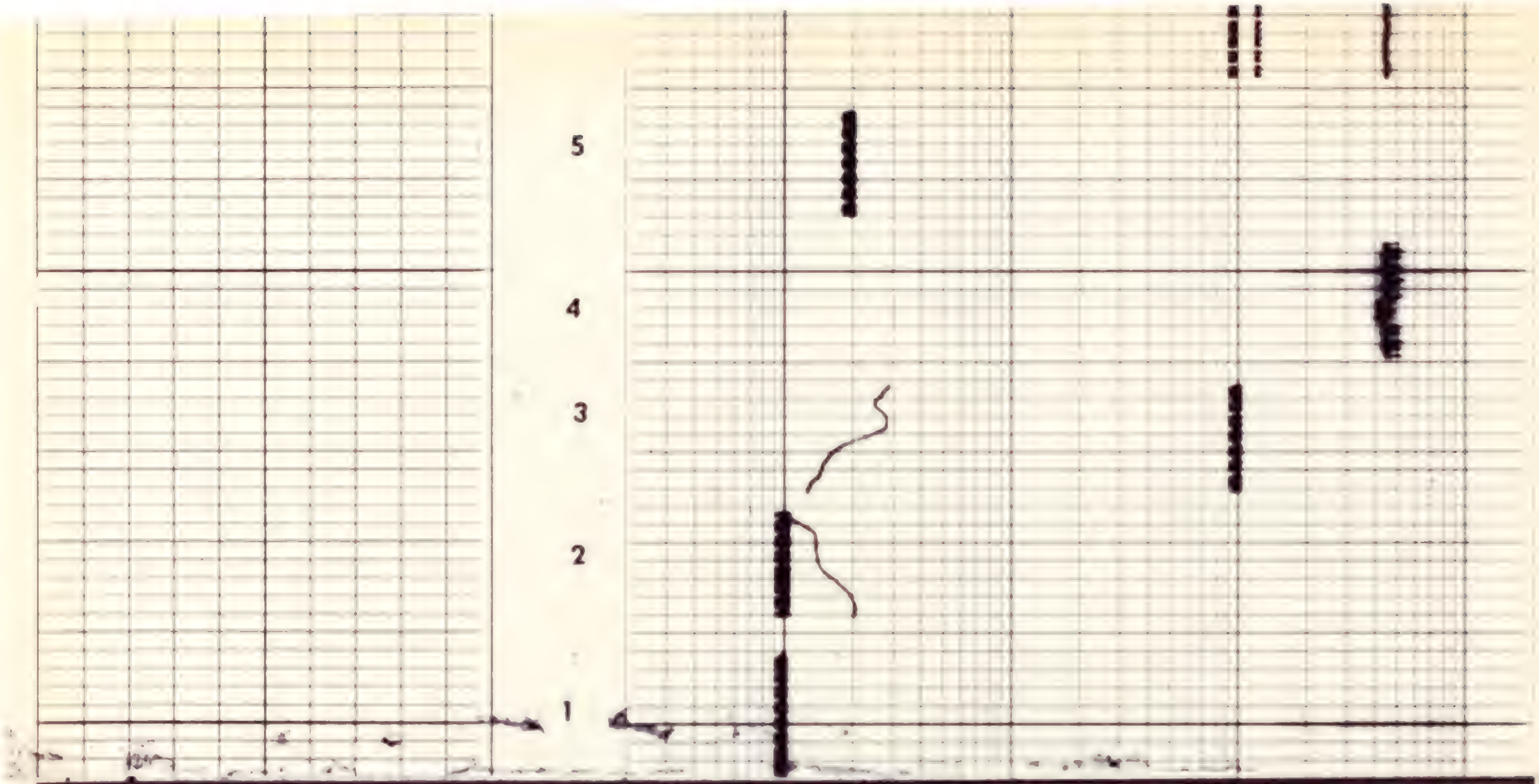
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1642
SCHL. TD 1646
DRLR TD 1640
Elev:
KB
DF
GL 6909

CALIBRATION RECORD



Calibration after Survey



CALIBRATION RECORD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL AQUIFER TEST #1-C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1642
SCHL. TD 1646
DRLR TD 1640
Elev:
KB
DF

WELL AQUIFER TEST #1-C

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

DRLR TD 1640

Elev:

KB

DF

GL 6909

SWS-1918-B

Schlum

Permanent Datu

Log Measured Fro

Drilling Measured

Date

Run No.

Type Fluid

Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL AT-1D
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL AT-1D

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:
1515 W. LINE-
1511 S. LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
CBL-GR
VDL-CCL

Permanent Datum: GROUND LEVEL ; Elev.: 6903
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6903

Date	10/3/74
Run No.	ONE
Pipe String No.	NO.1 & NO.2
Pipe String Ident.	LONG & MIDDLE
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	----
Density	----
Level	FULL
Max rec. temp., deg F.	----
Operating rig time	----
Recorded by	ST. AUBYN
Witnessed by	MR. BARRET

BORE-HOLE RECORD			CEMENTING RECORD				
Bit	From	To		Type	Wgt.	From	To
7 7/8	60	TD	Primary	HOWCO		795	TD
				LT. WT.			
			Squeeze				

The well name, location and borehole reference data were furnished by the customer

FOLD HERE

SWS 15.1 A

EQUIPMENT DATA

Hoist Truck No.	3862	Rotator Size	1 11/16"
Inst. Truck No.	3862	Rotator No.	
Tool Serial No.	11	Indexer Type	
Location	VERNAL	Indexer No.	

DEPTHS RELATE TO

Radioactivity Measurements ☒
Schlumberger Line Measurements ☐

CASING COLLARS

PERFORATING DATA / LOGGING DATA

Depths From	Depths To	No. Shots	Gun Size	Gun Type	Time Const	Sens. Setting	Zero Shift	Calib. Sens.	Calib. Defl.
NO.1-LONG STRING									
1435	1480	4E	1 11/16	HYPERDOME					
NO.2-MIDDLE STRING									
1050	1300	251	1 11/16	HYPERDOME					

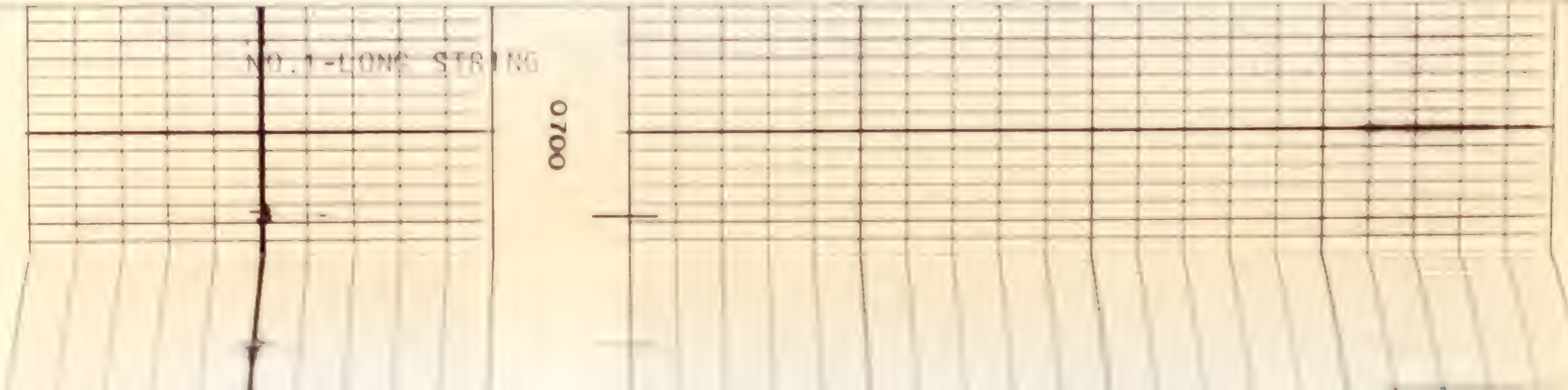
Remarks: NO PERFORATING IN NO.3-SHORT STRING

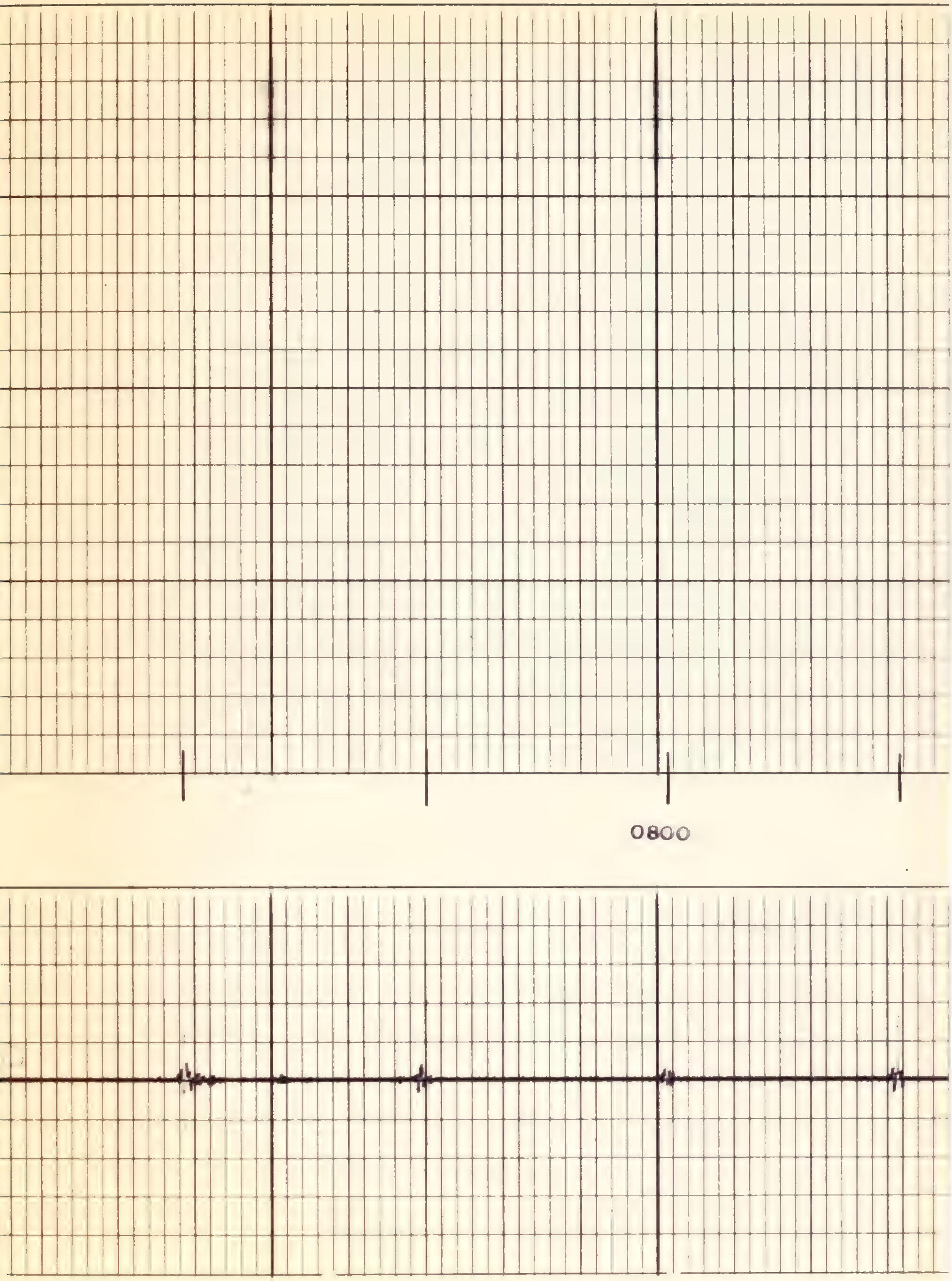
PIPE STRING RECORD

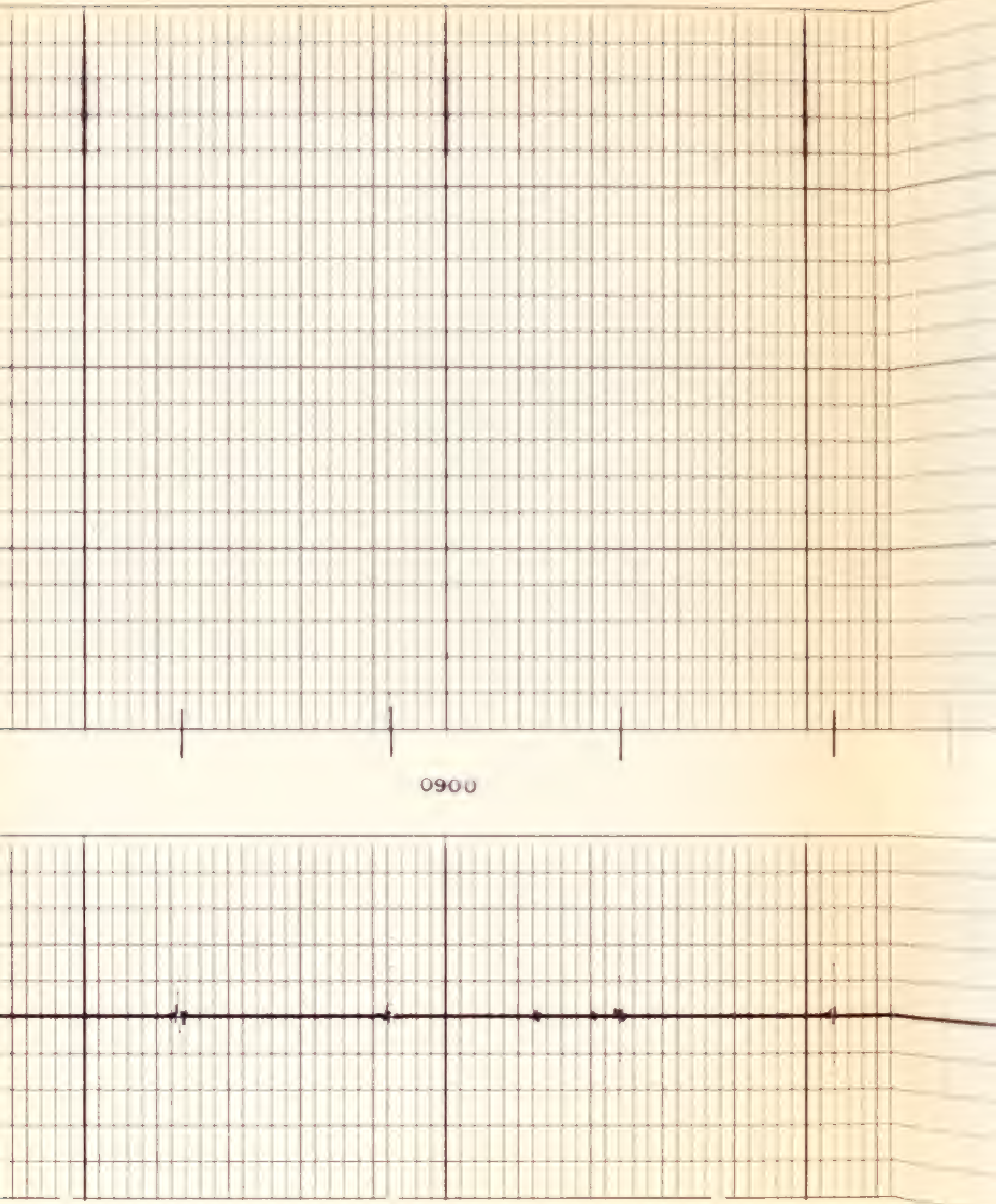
Number	1	2	3	4
Identifict'n	LONG	MIDDLE	SHORT	
Size	2 3/8	2 3/8	2 3/8	
Weight	4.7	4.7	4.7	
Depth	1640	1441	1079	

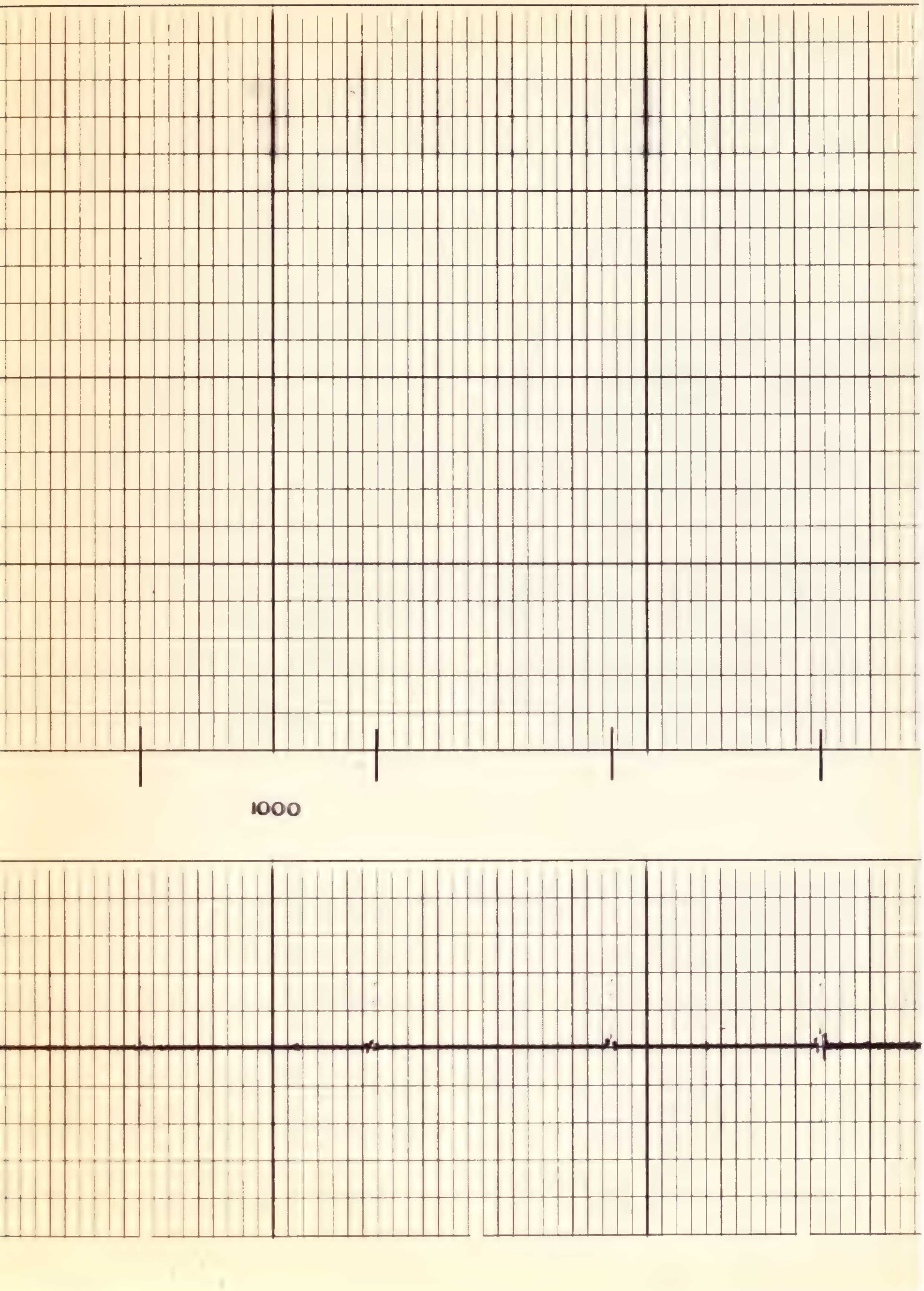
CASING COLLAR LOG
BEFORE PERFORATION

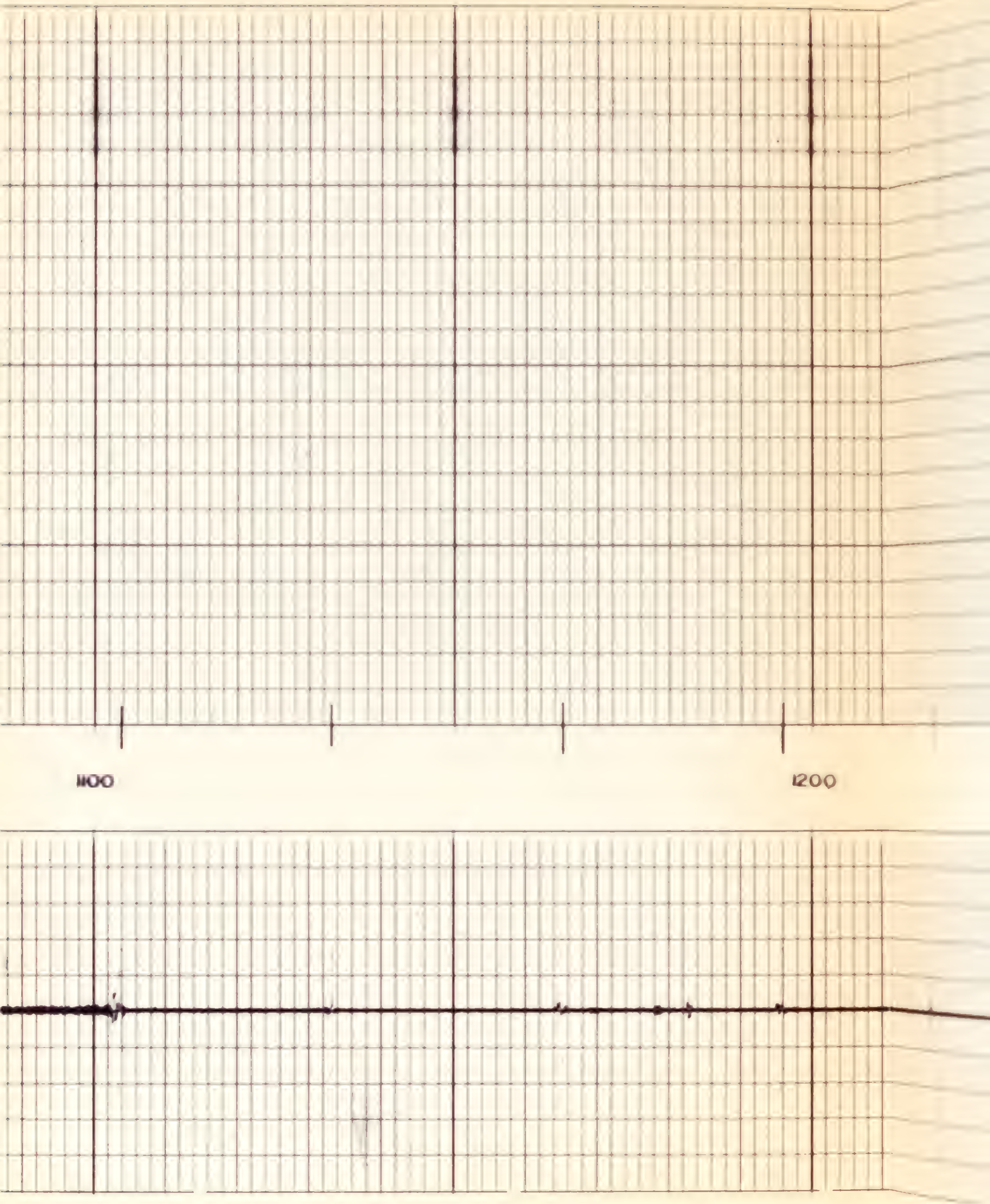
DEPTHS

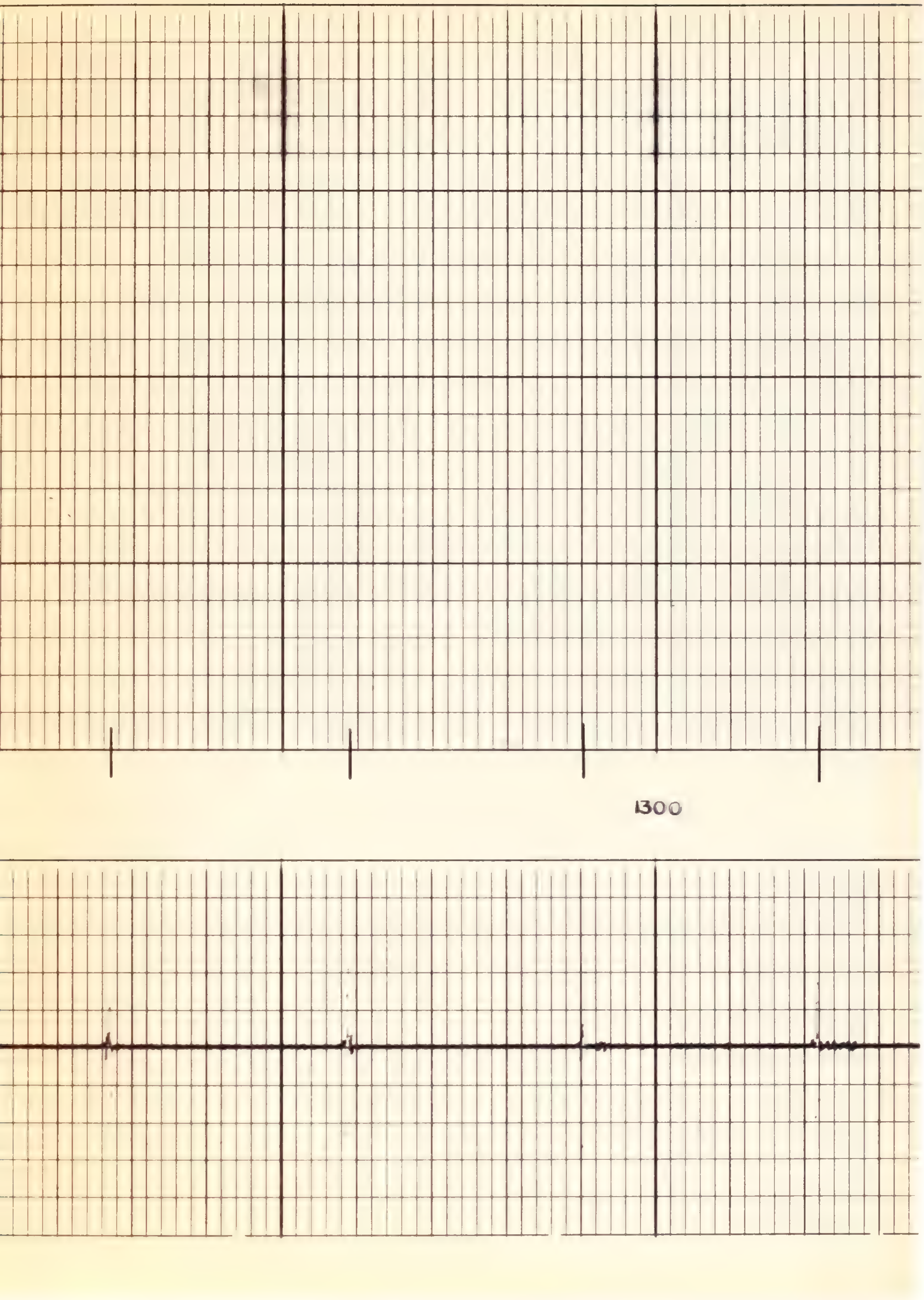


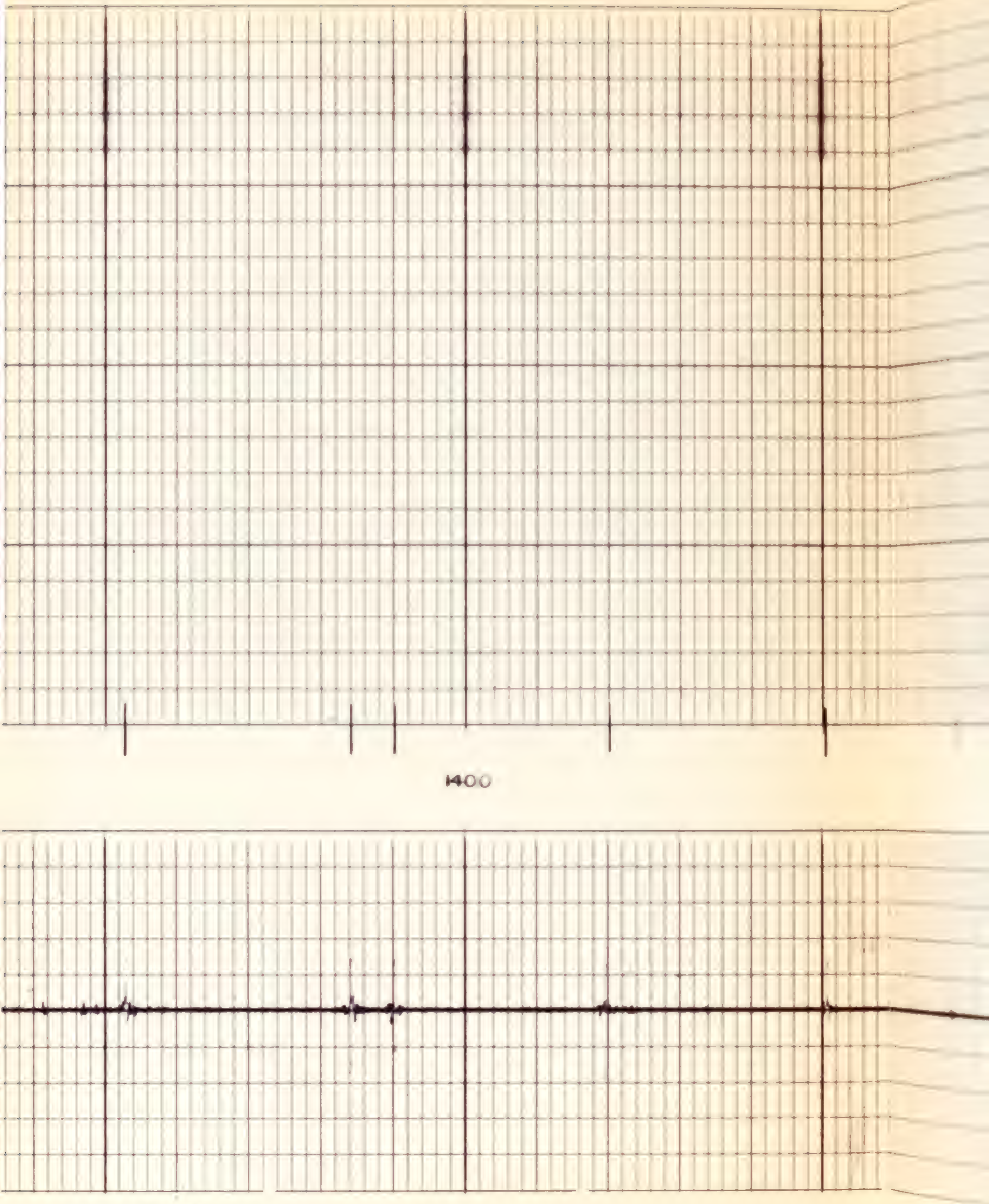

0800

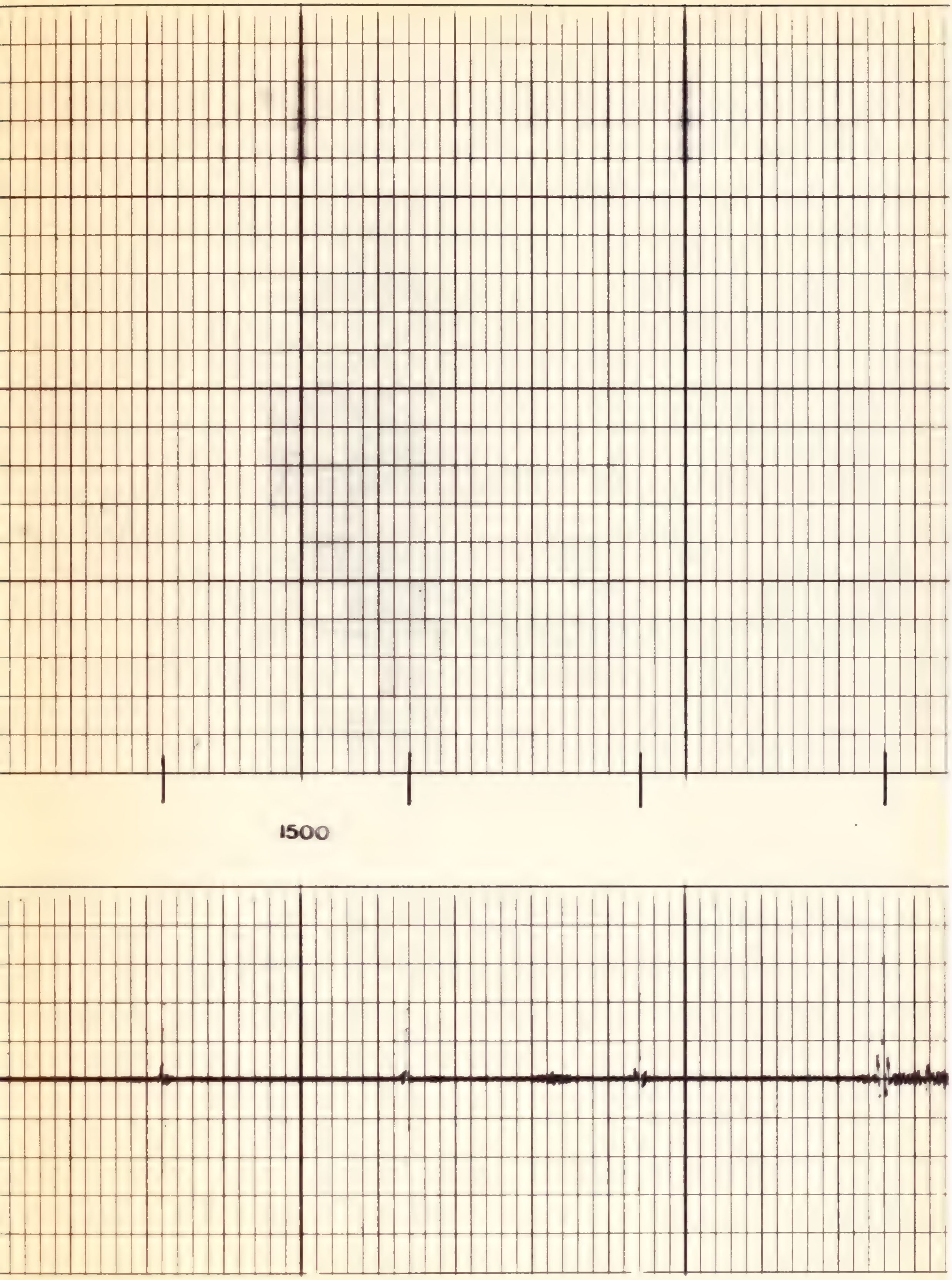

0900


1000


1100
1200


1300


1400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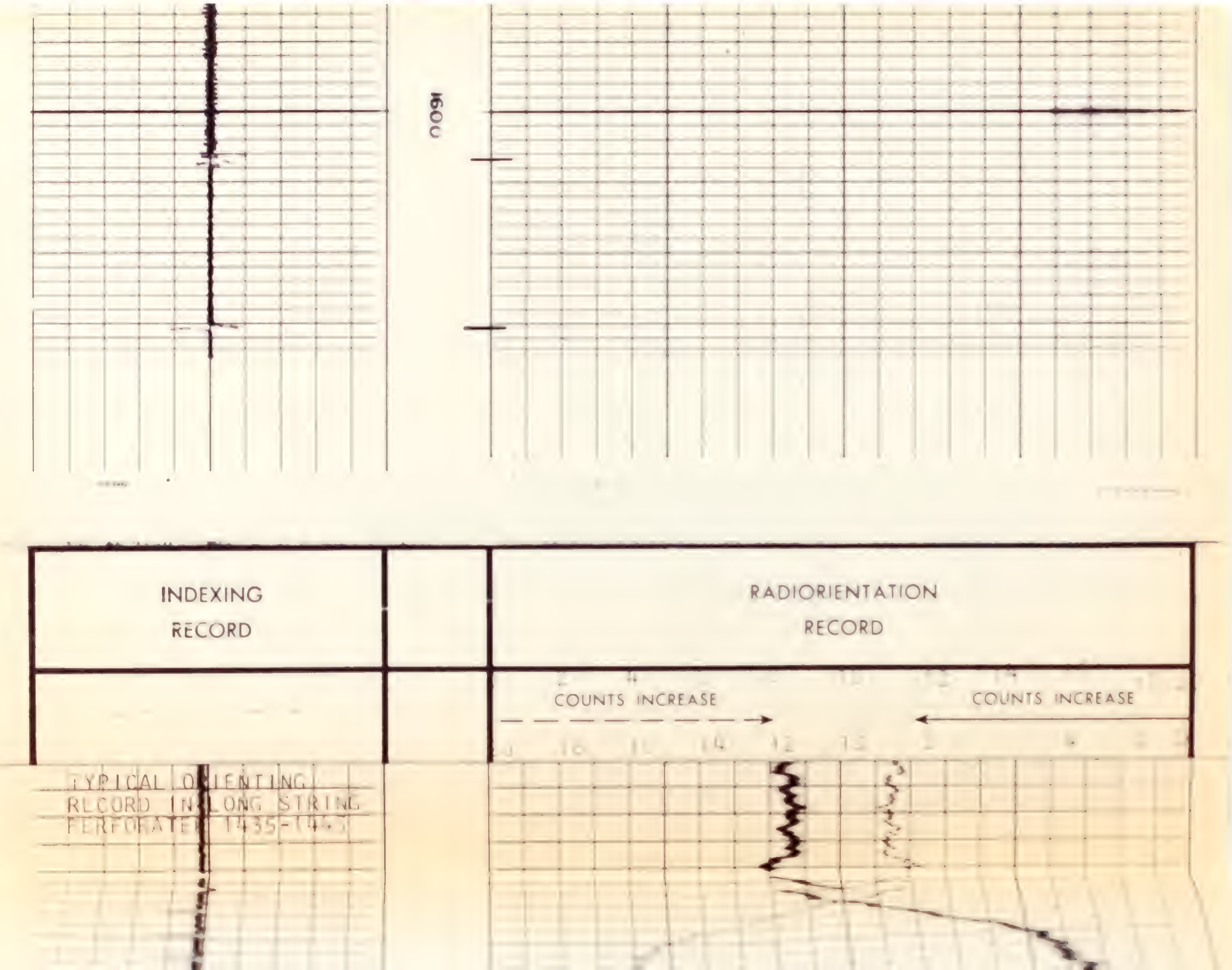
1600
INDEXING
RECORD
RADIORIENTATION
RECORD
COUNTS INCREASE
COUNTS INCREASE
2
4
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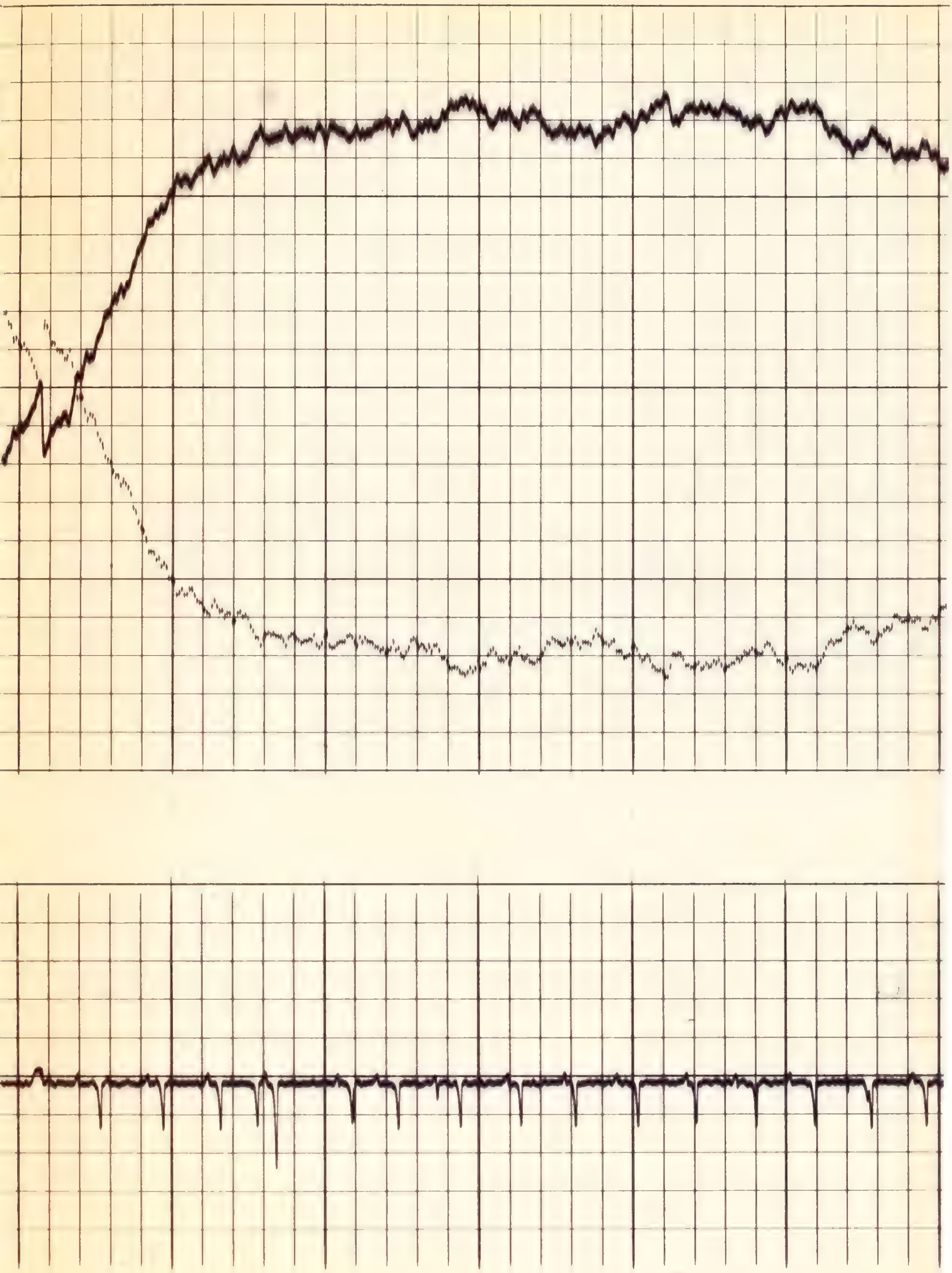
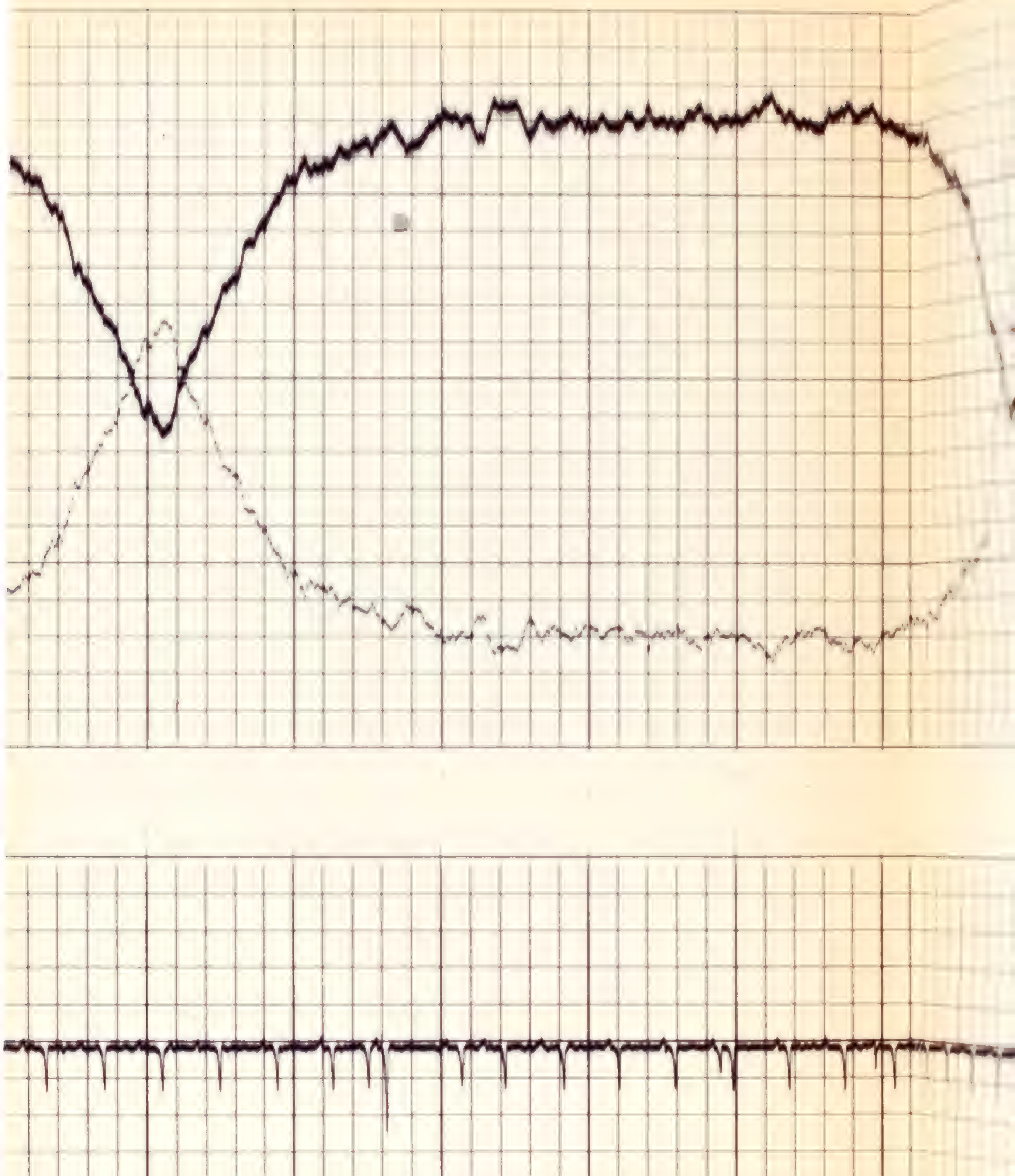
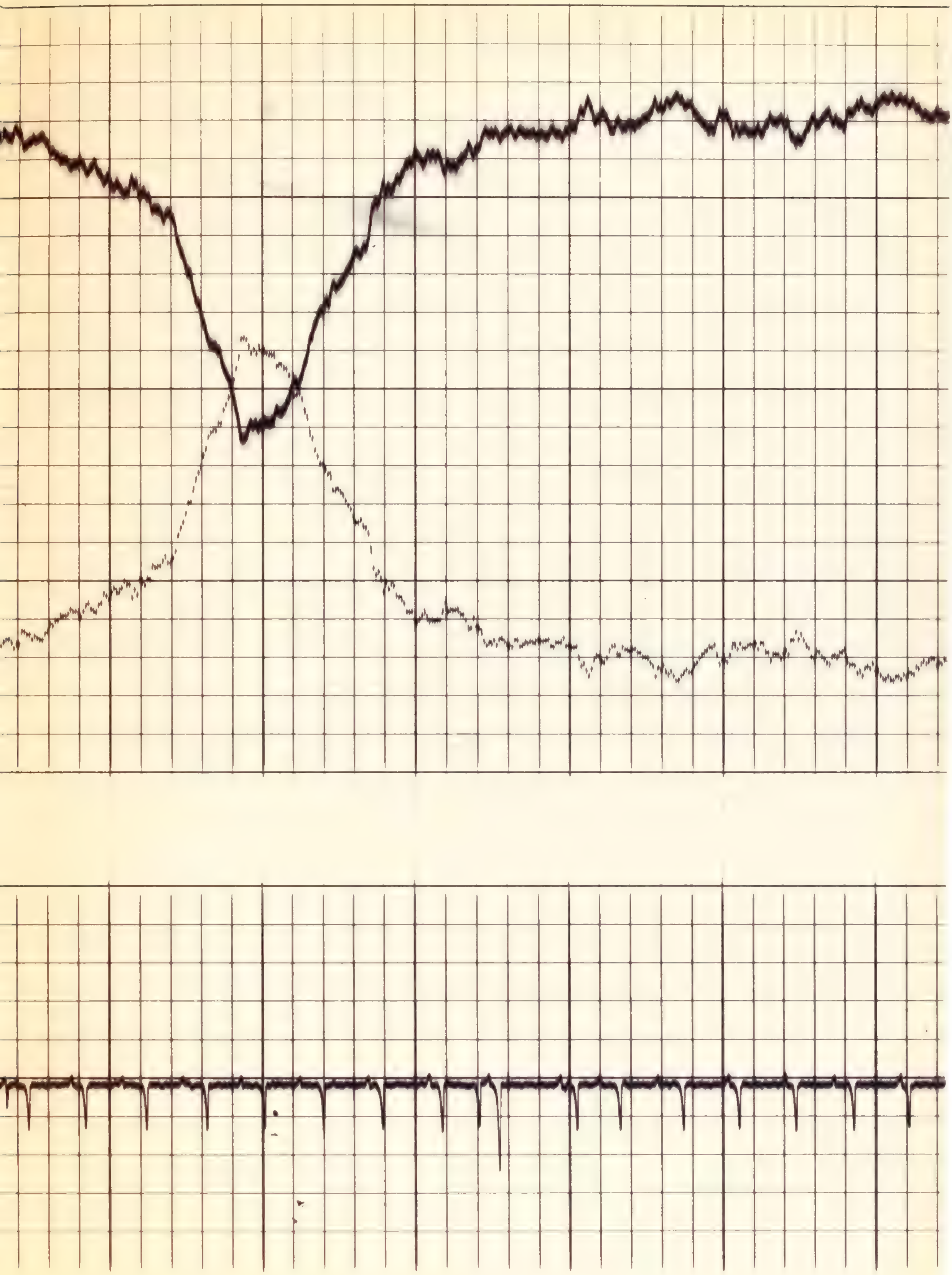
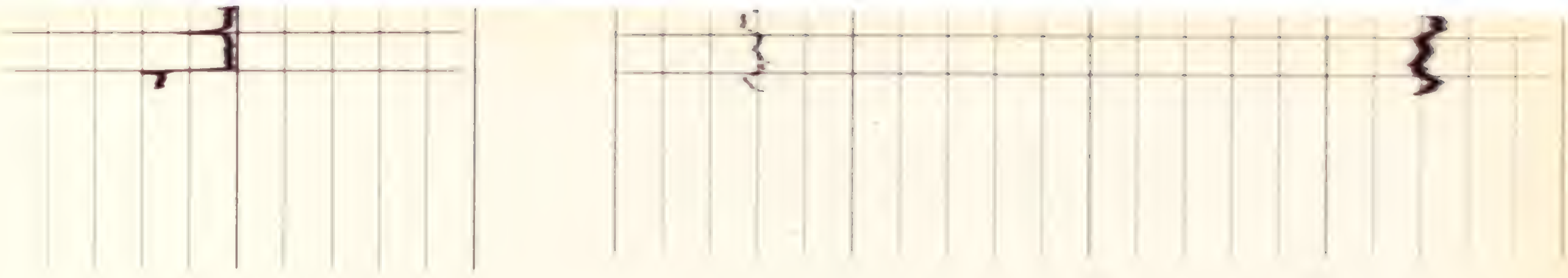
12
14
16
14
12
TYPICAL ORIENTING
RECORD IN LONG STRING
PERFORATED 1435-1445





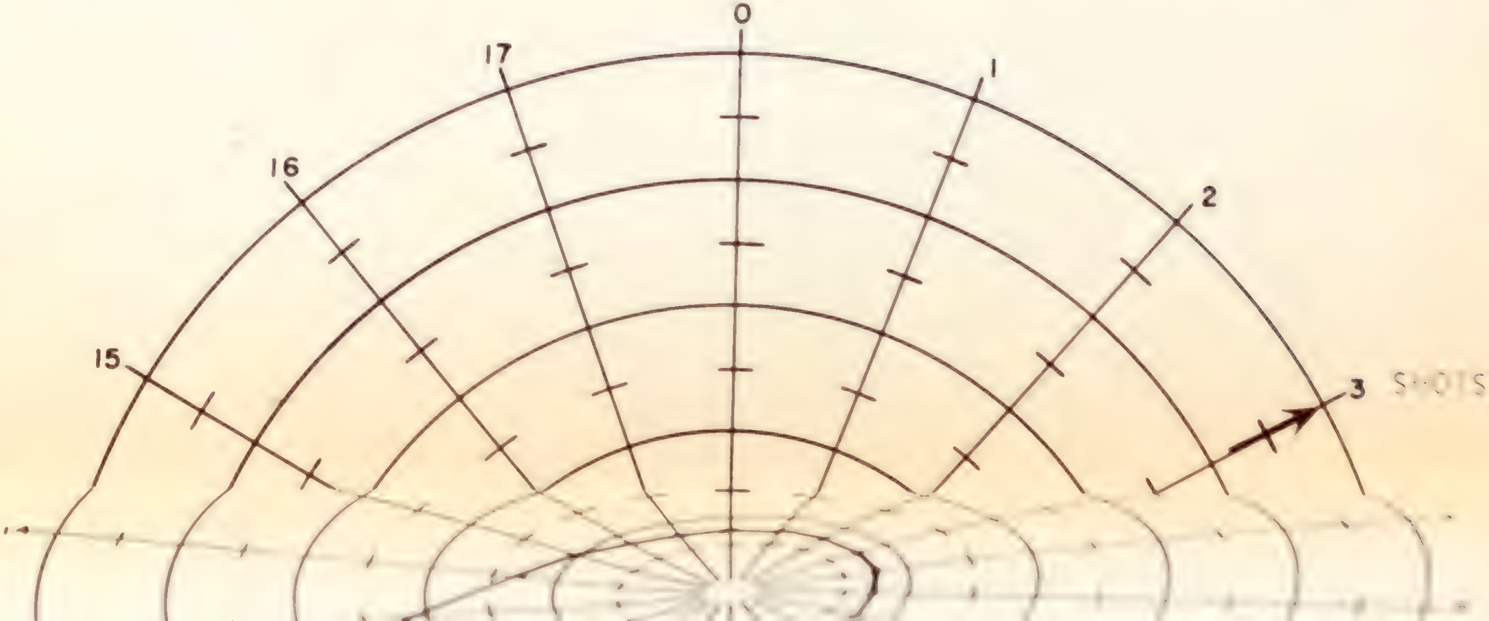


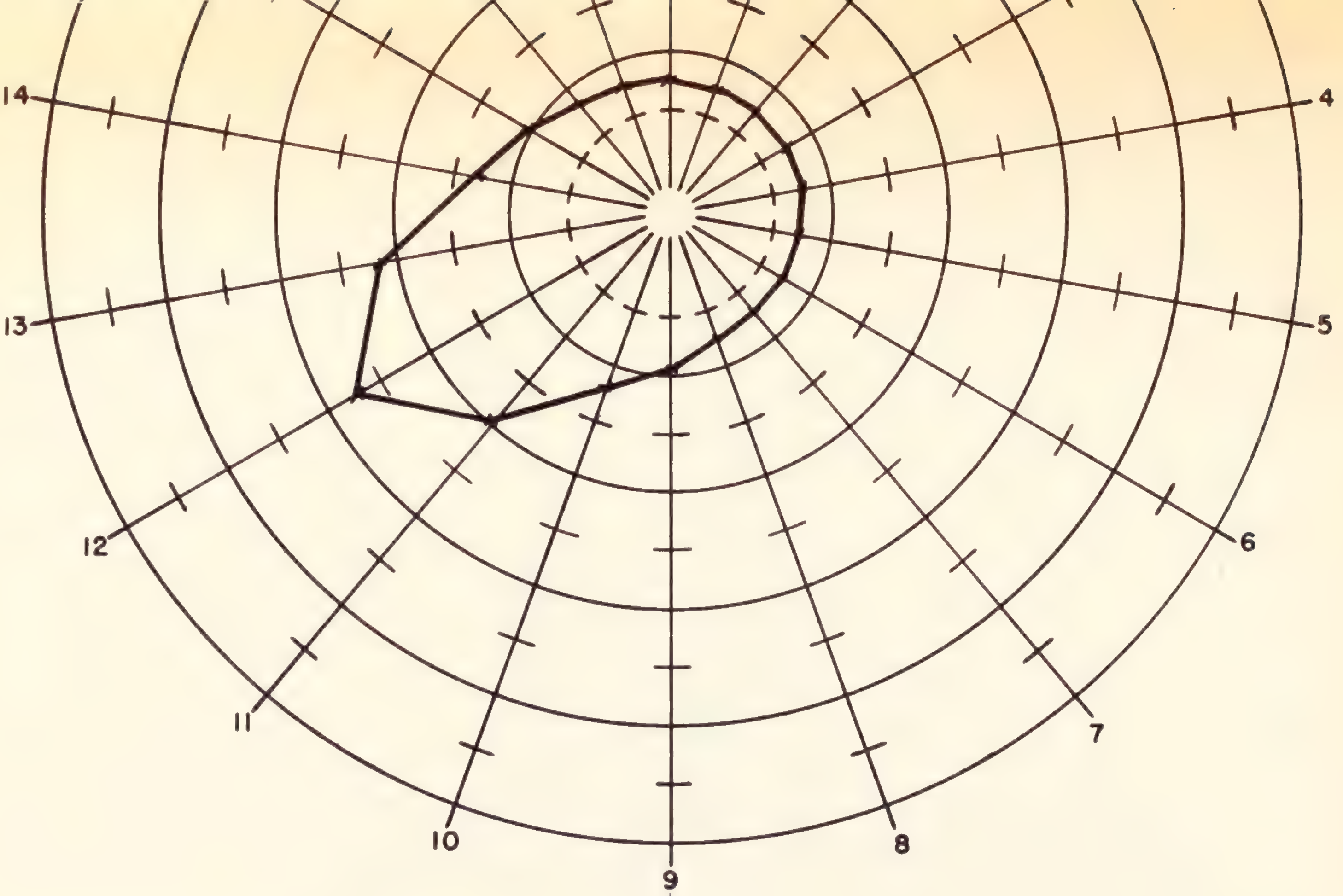


RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING PERFORATED 1435-1445 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
PLOT MADW FROM ORIENTING RECORD ABOVE





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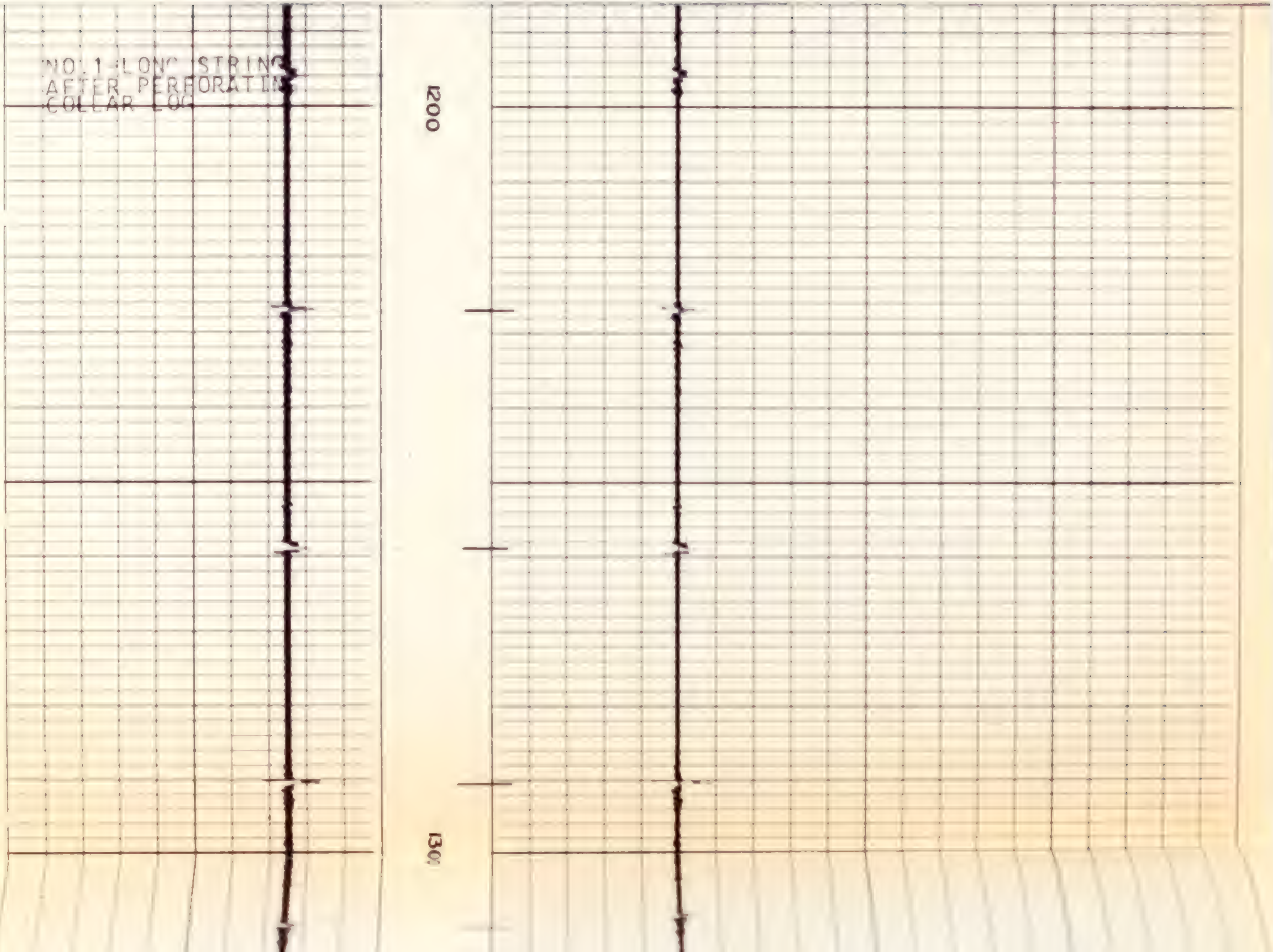
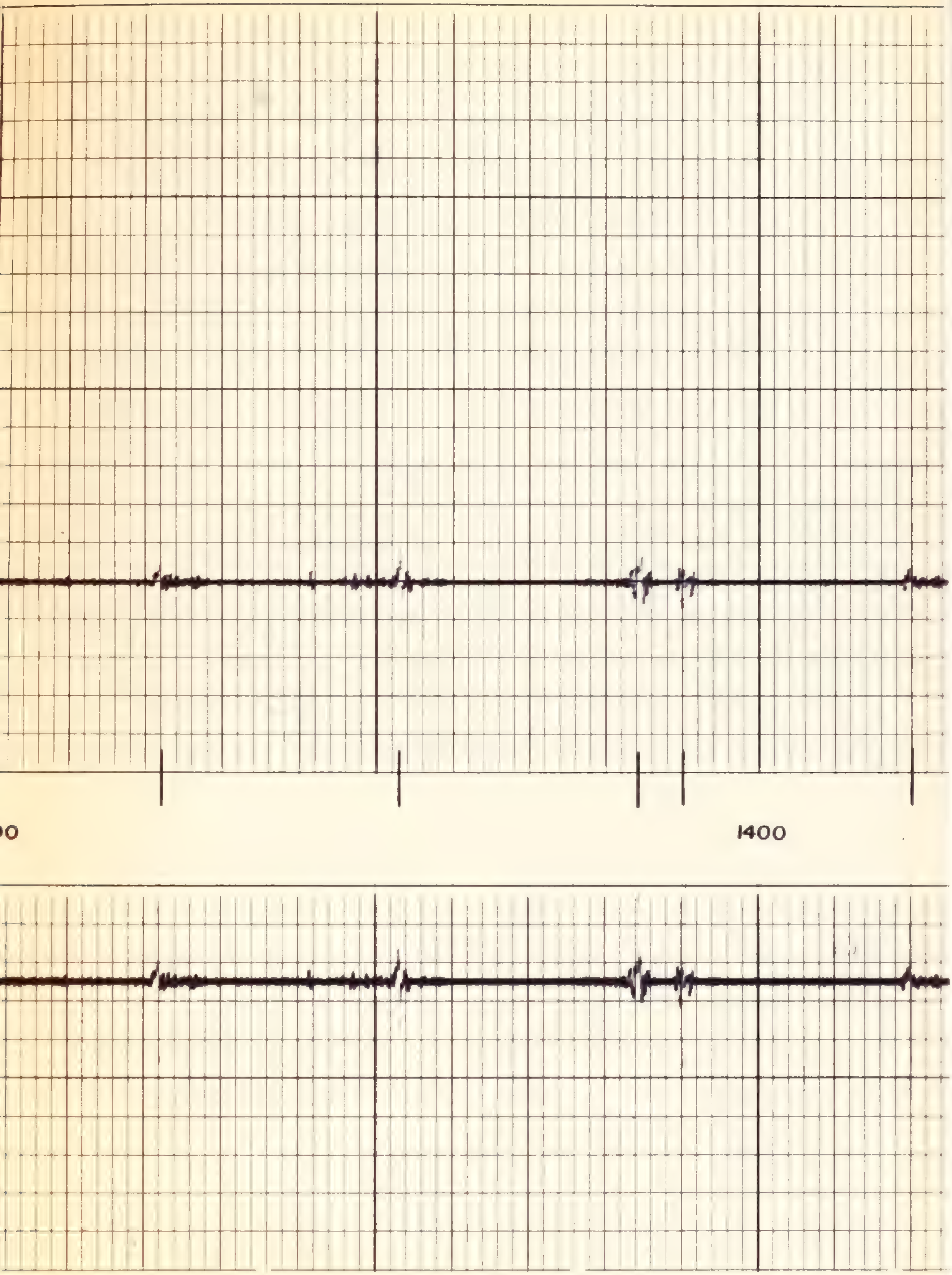
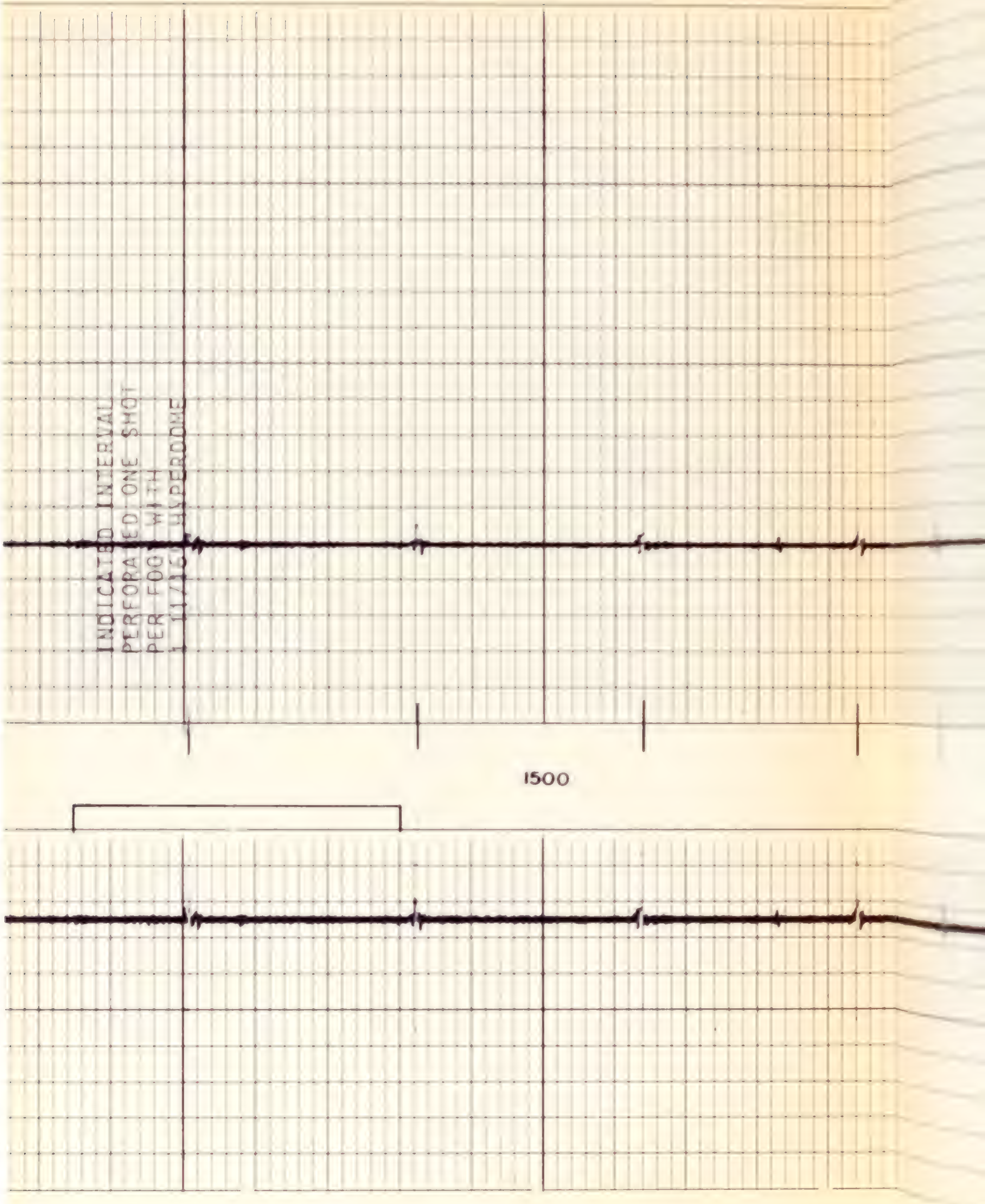
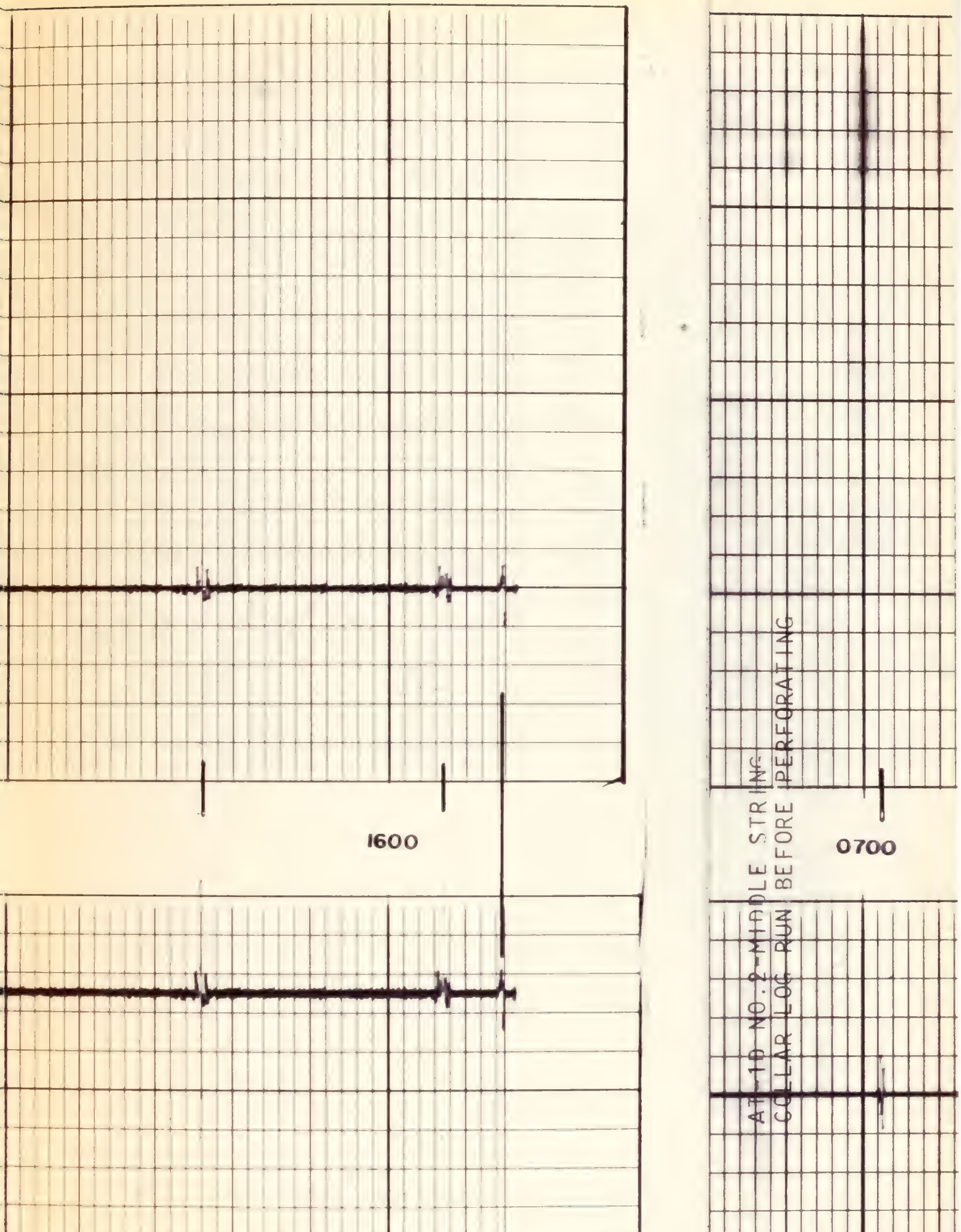
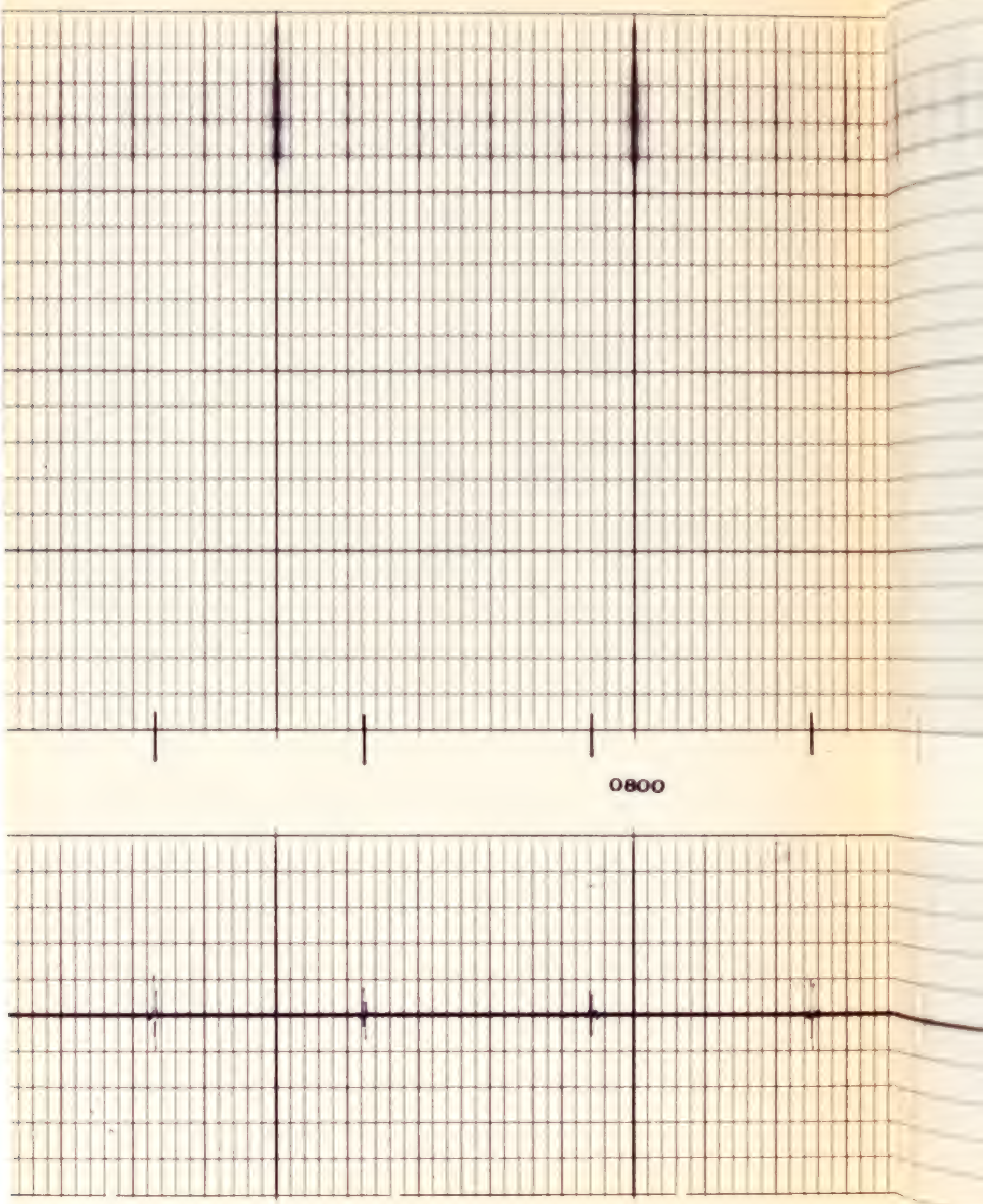
Schlumberger

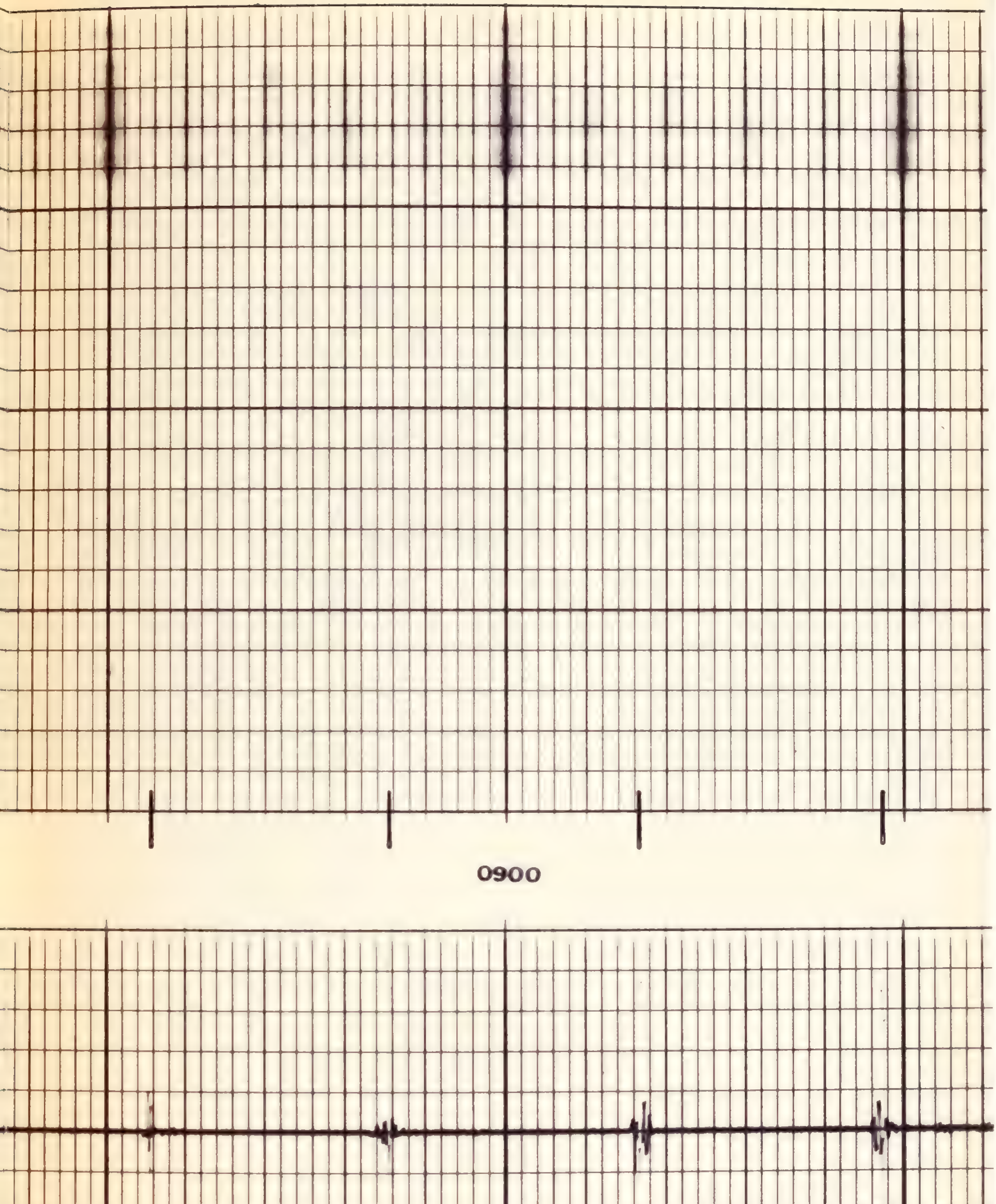

"NO. 1 'LONG' STRING
AFTER PERFORATING
COLLAR LOG
1200
130

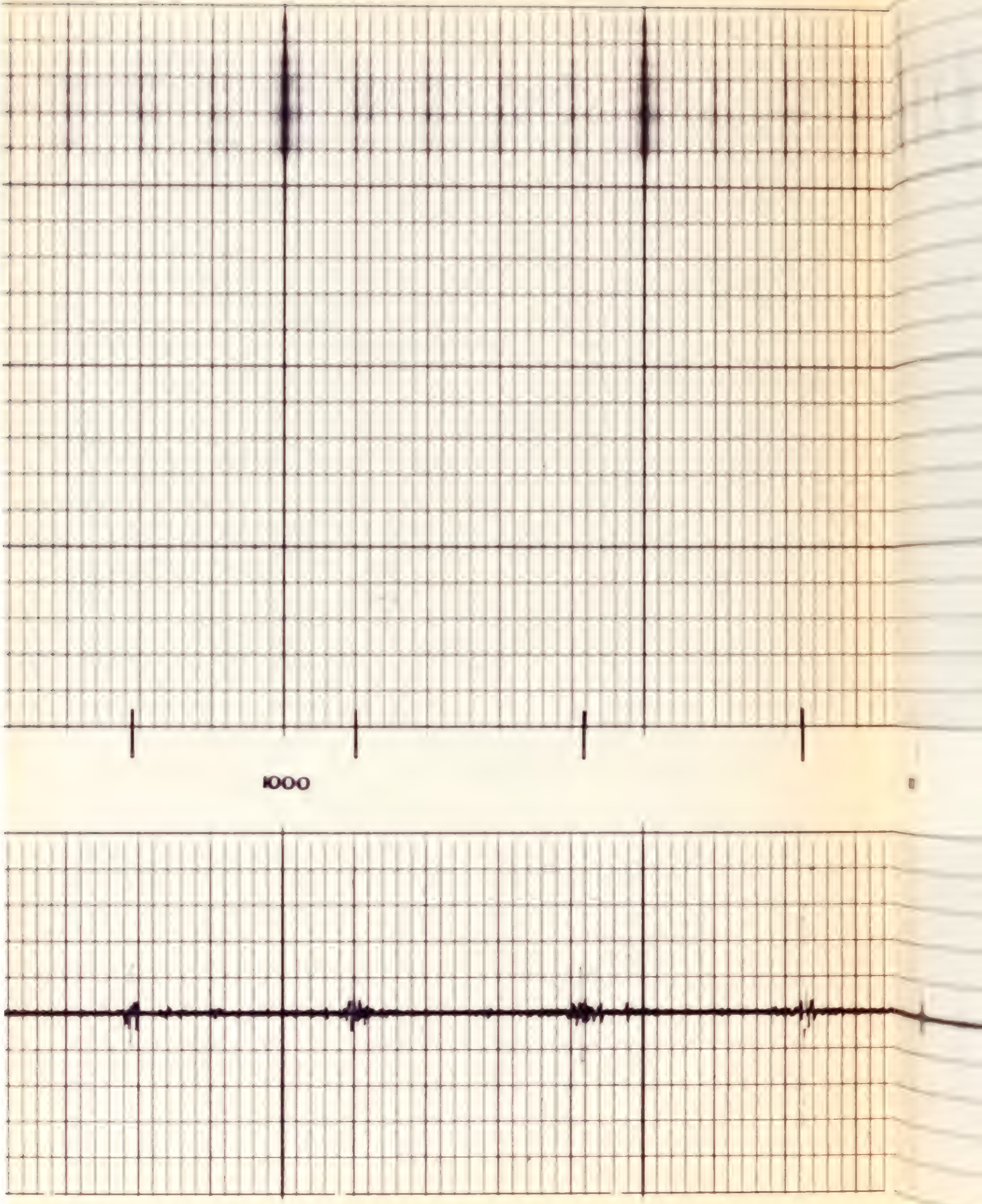

00
1400

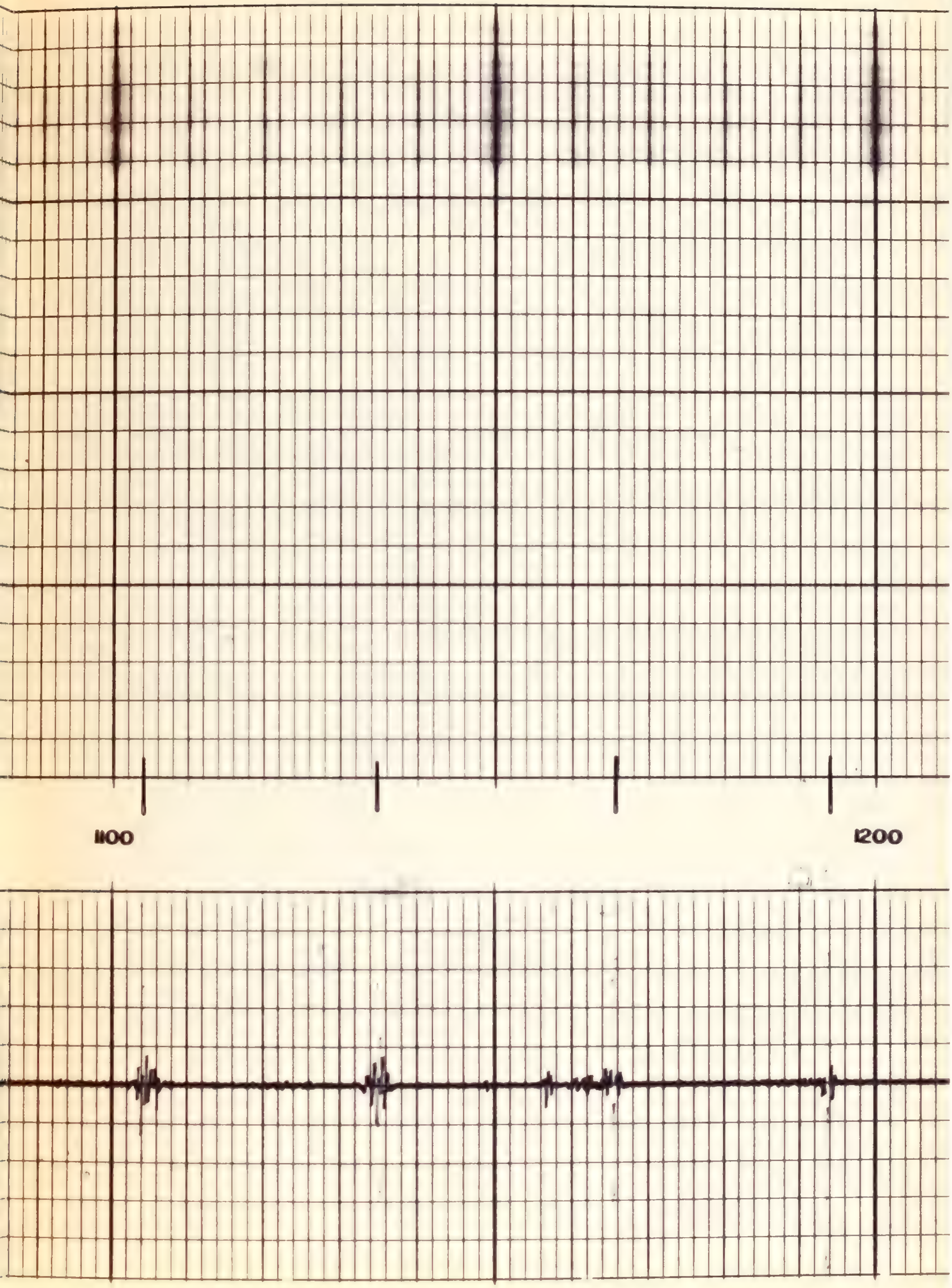

INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16 HYPERDOME
1500

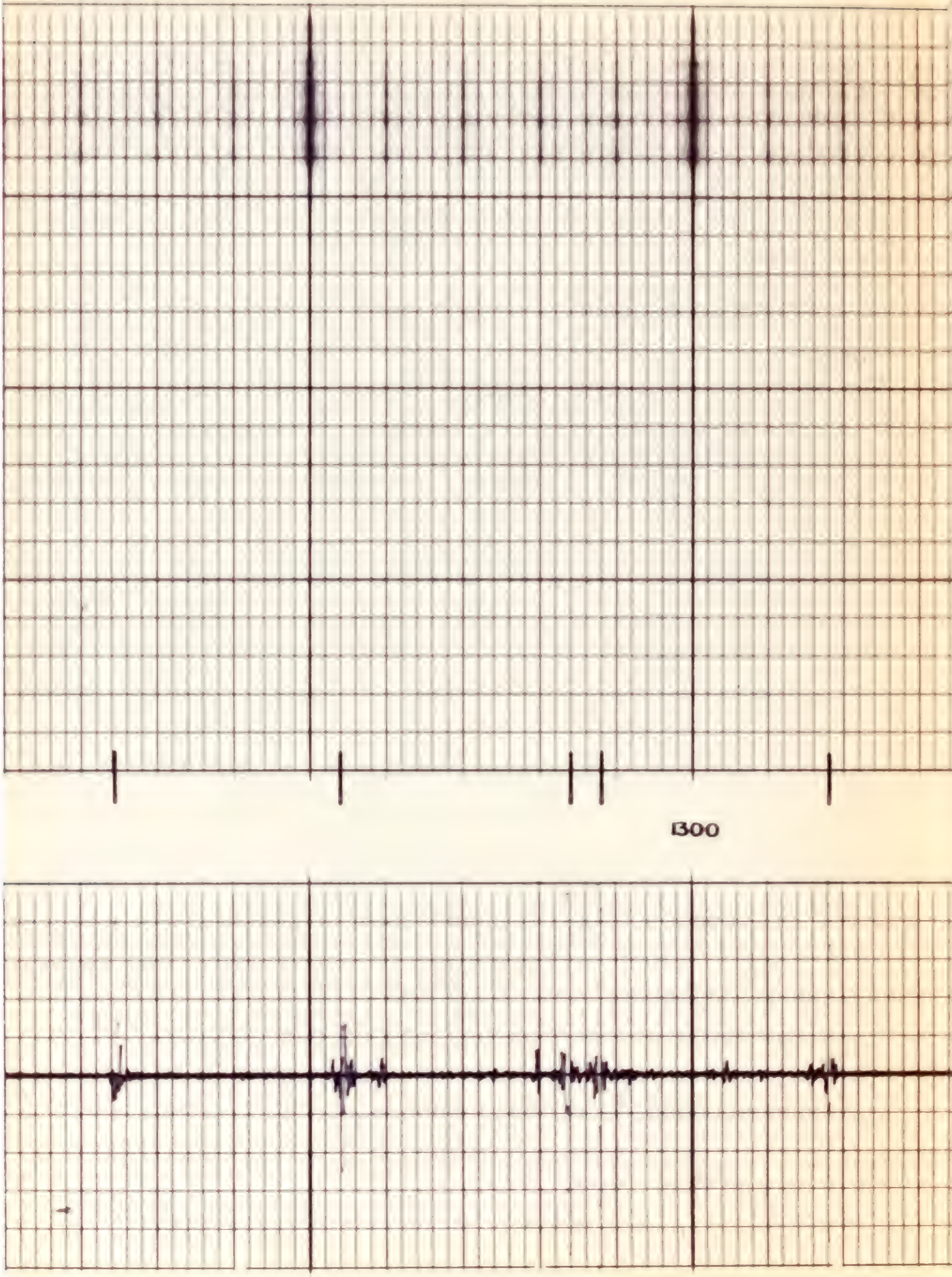

1600
0700
AT-1D NO. 2-MIDDLE STRING
COLLAR LOG RUN BEFORE PERFORATING

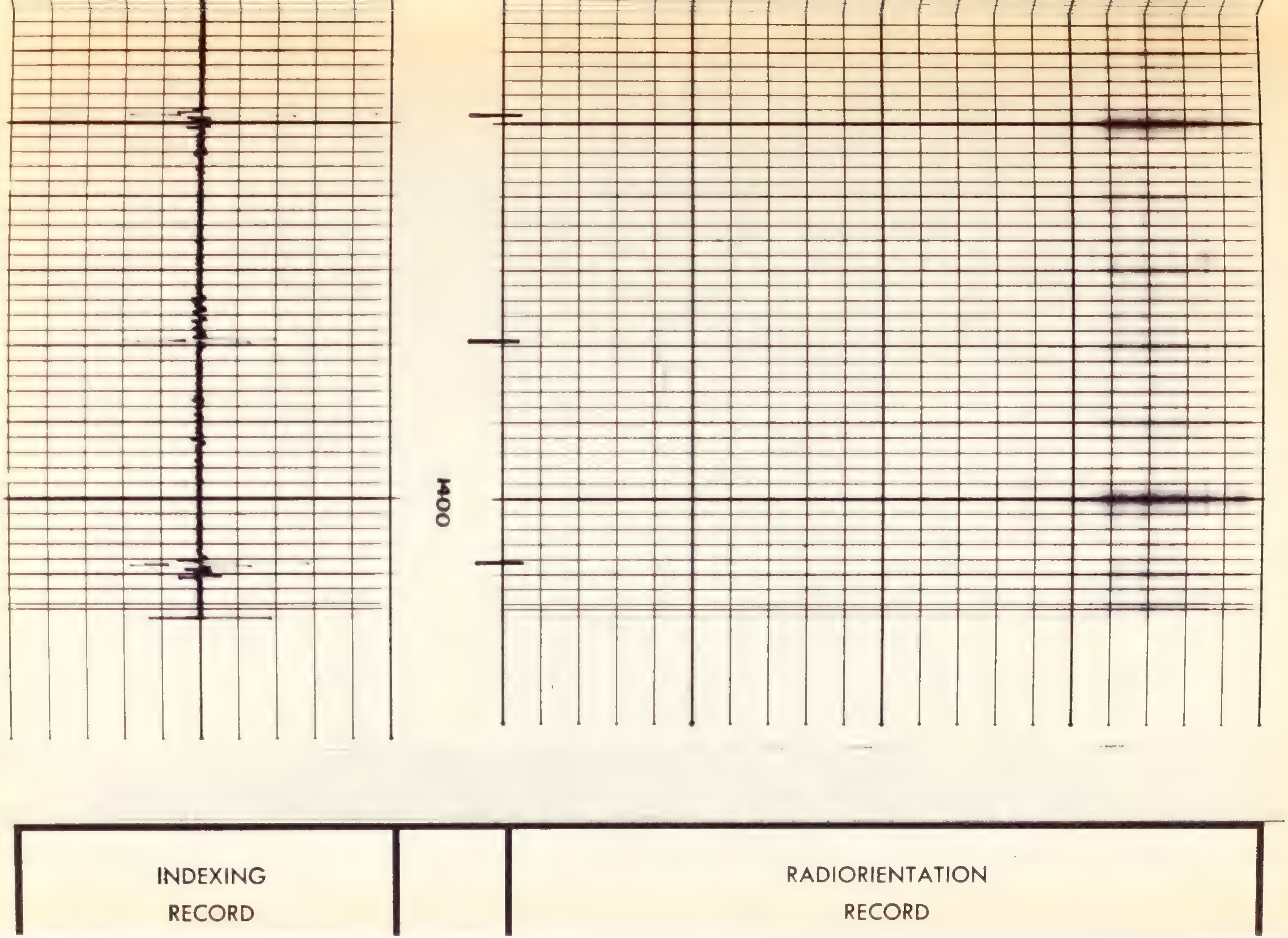

0800

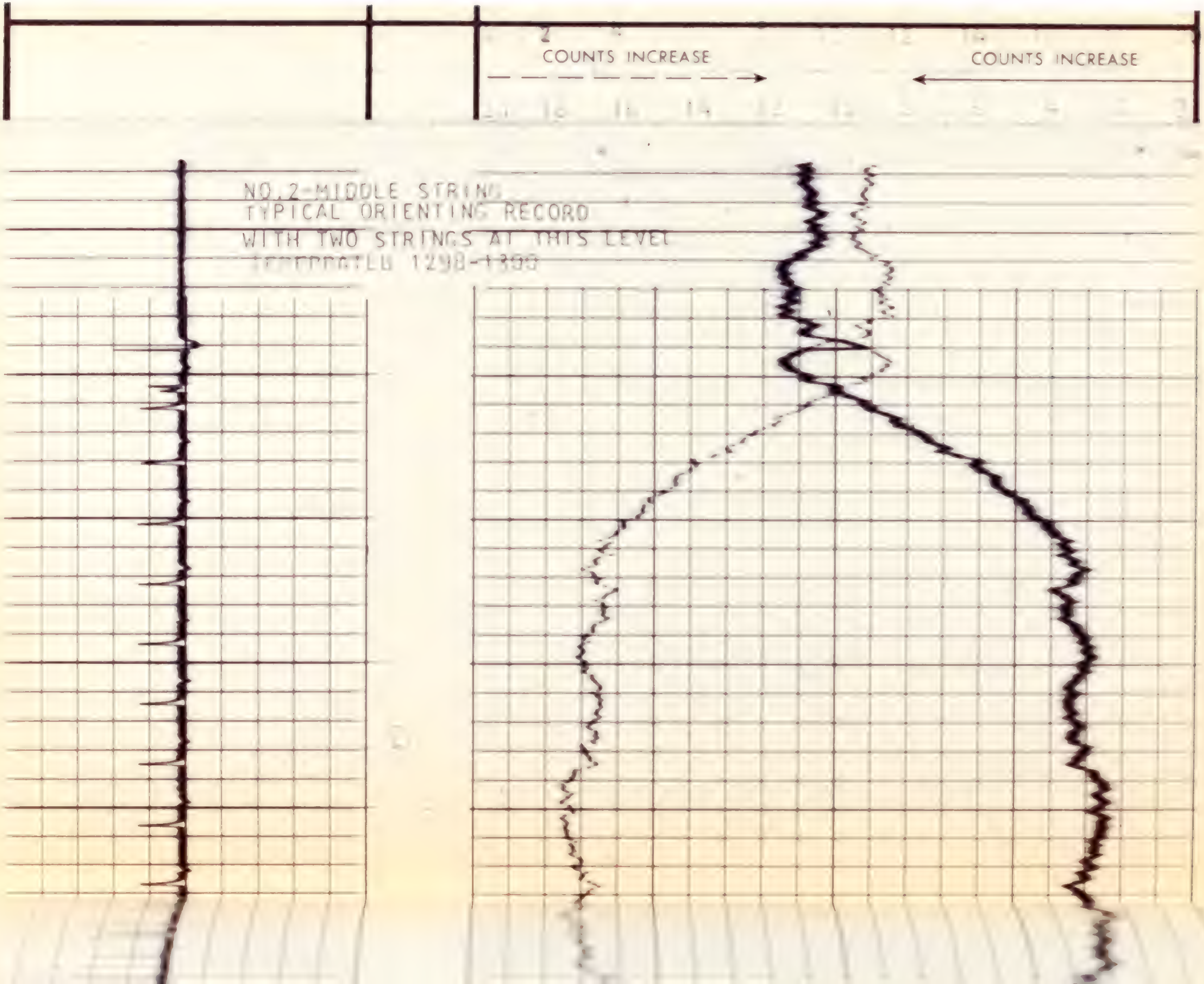

0900

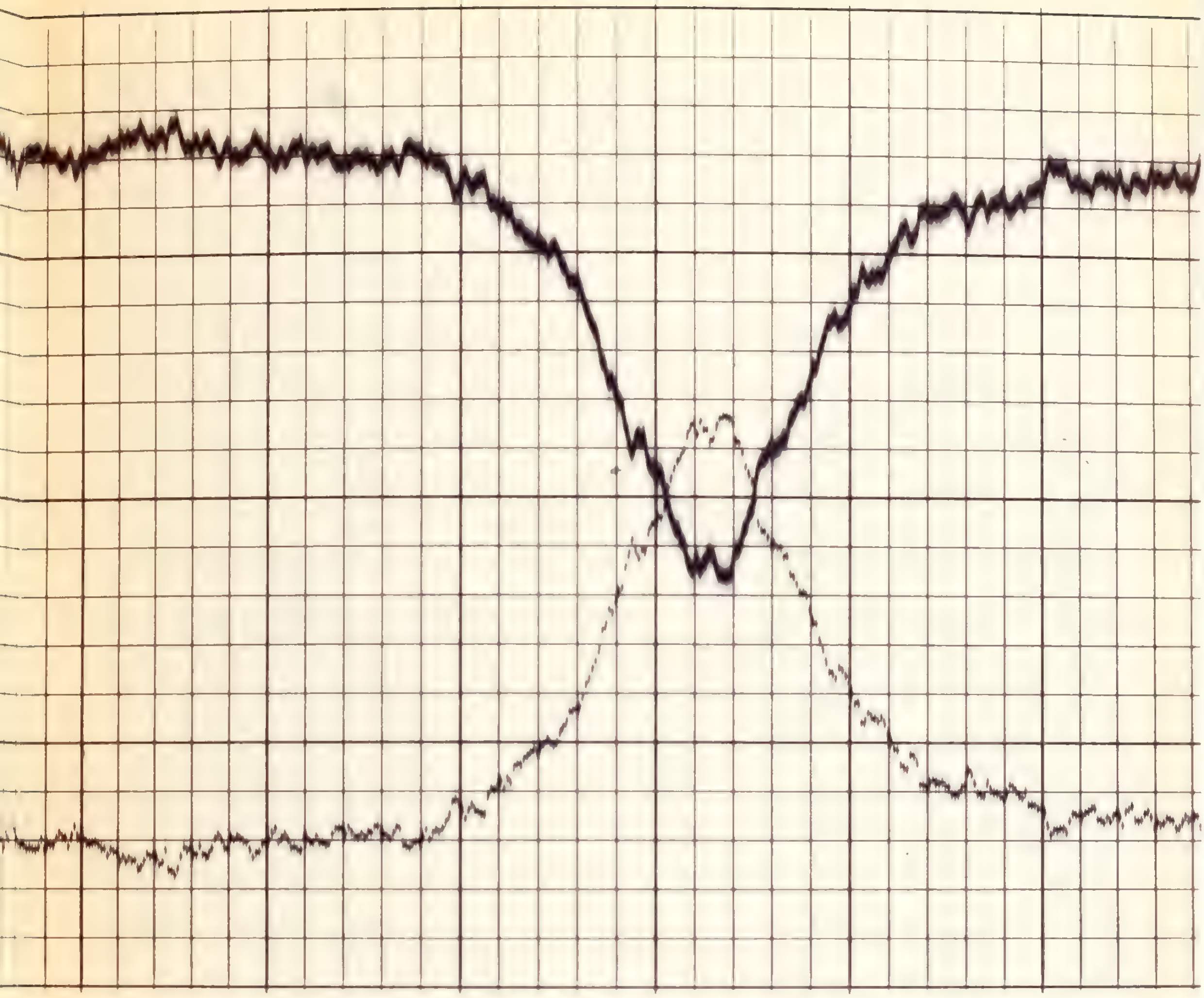

1000

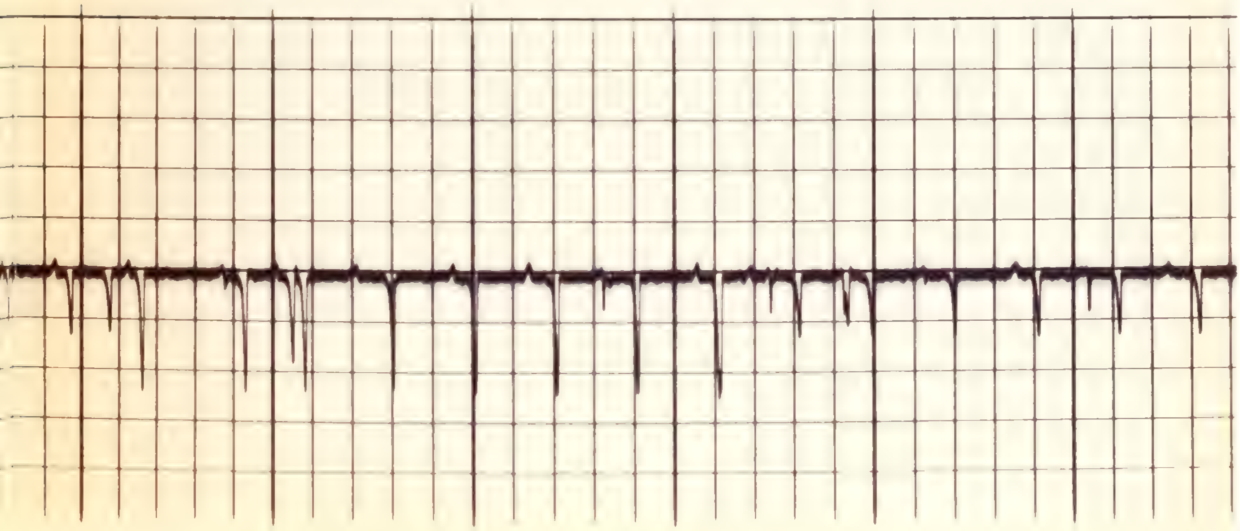

1100
1200

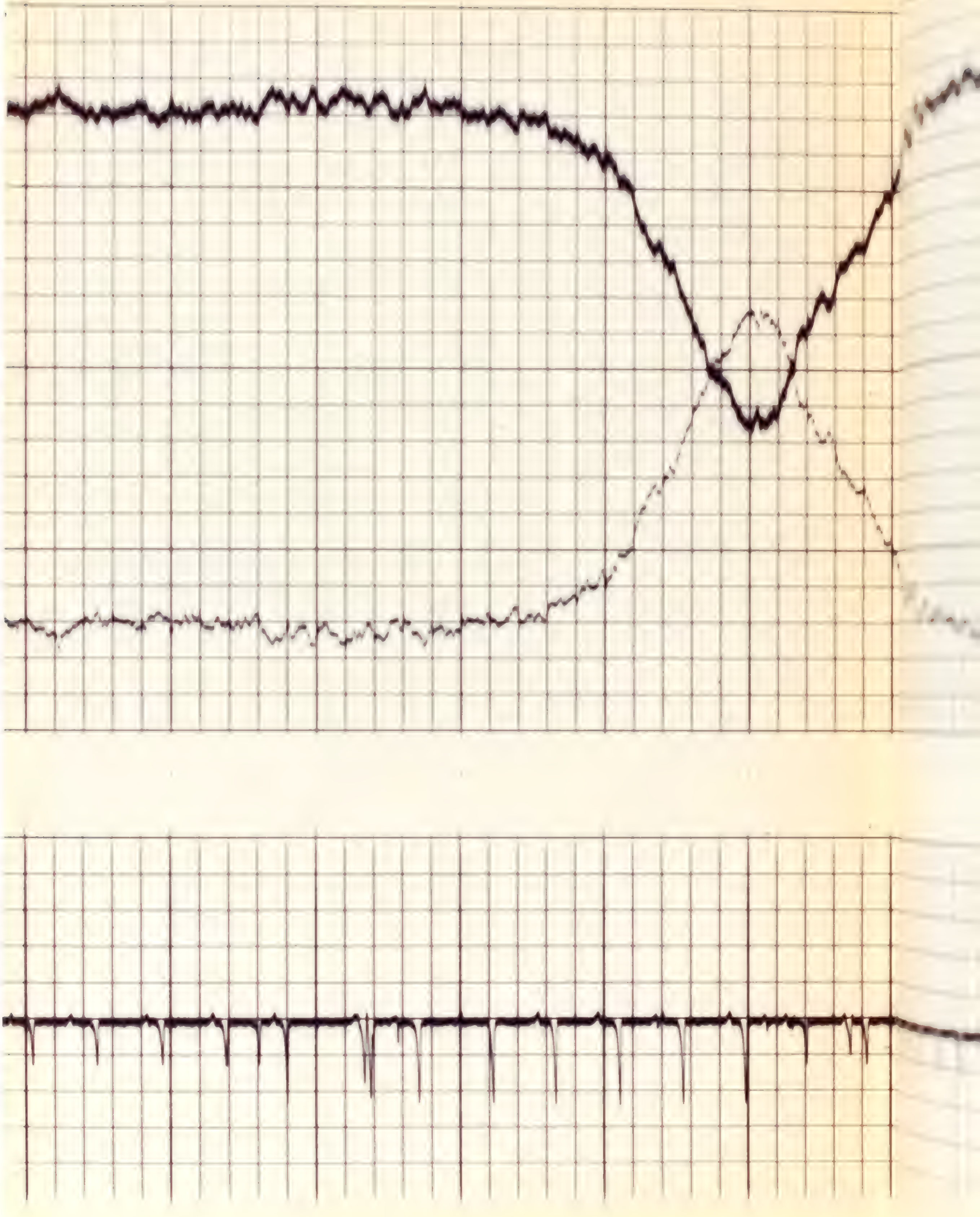

1300

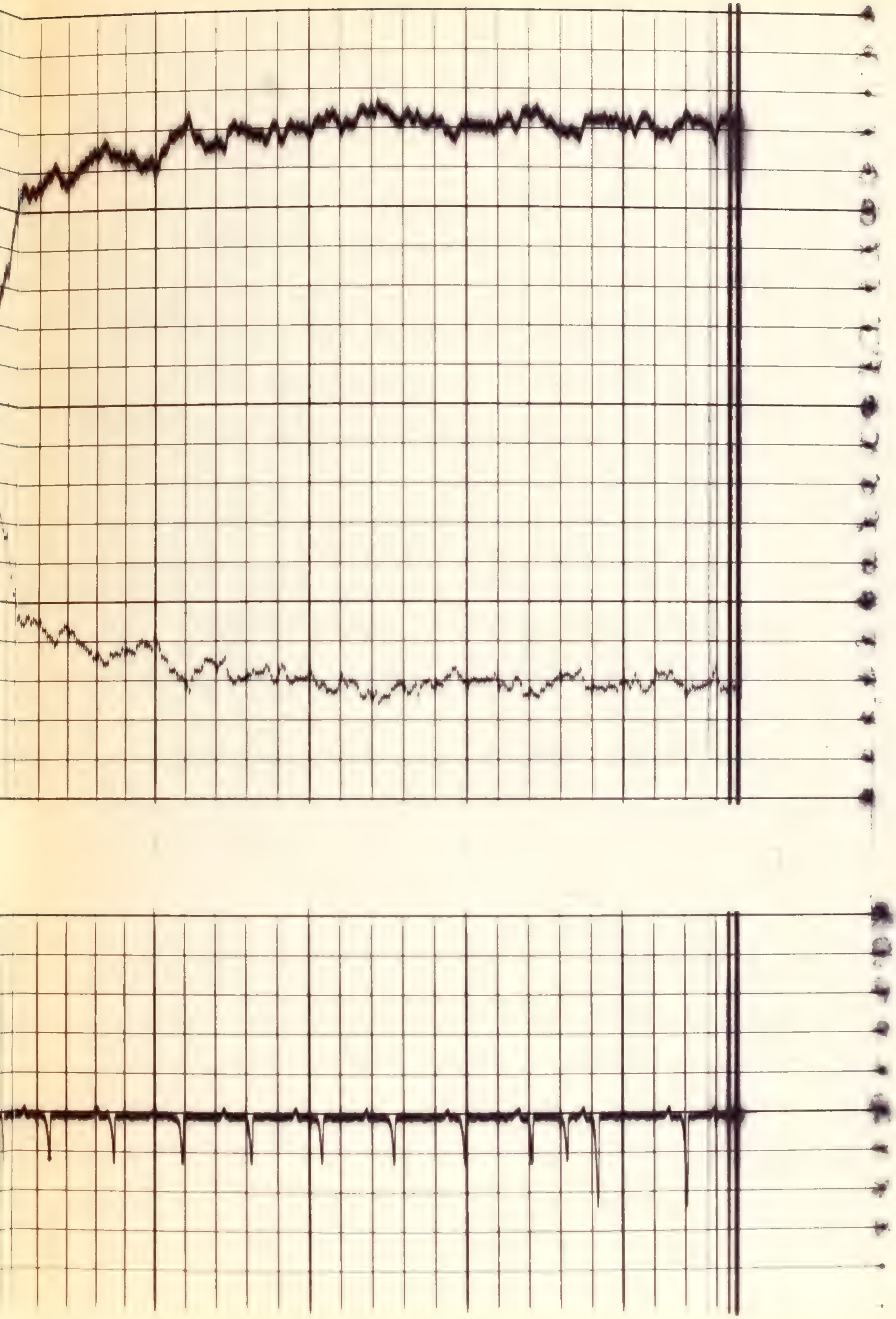

1400
INDEXING RECORD
RADIORIENTATION RECORD


COUNTS INCREASE
COUNTS INCREASE
NO.2-MIDDLE STRING
TYPICAL ORIENTING RECORD
WITH TWO STRINGS AT THIS LEVEL
PERFORATED 1298-1300





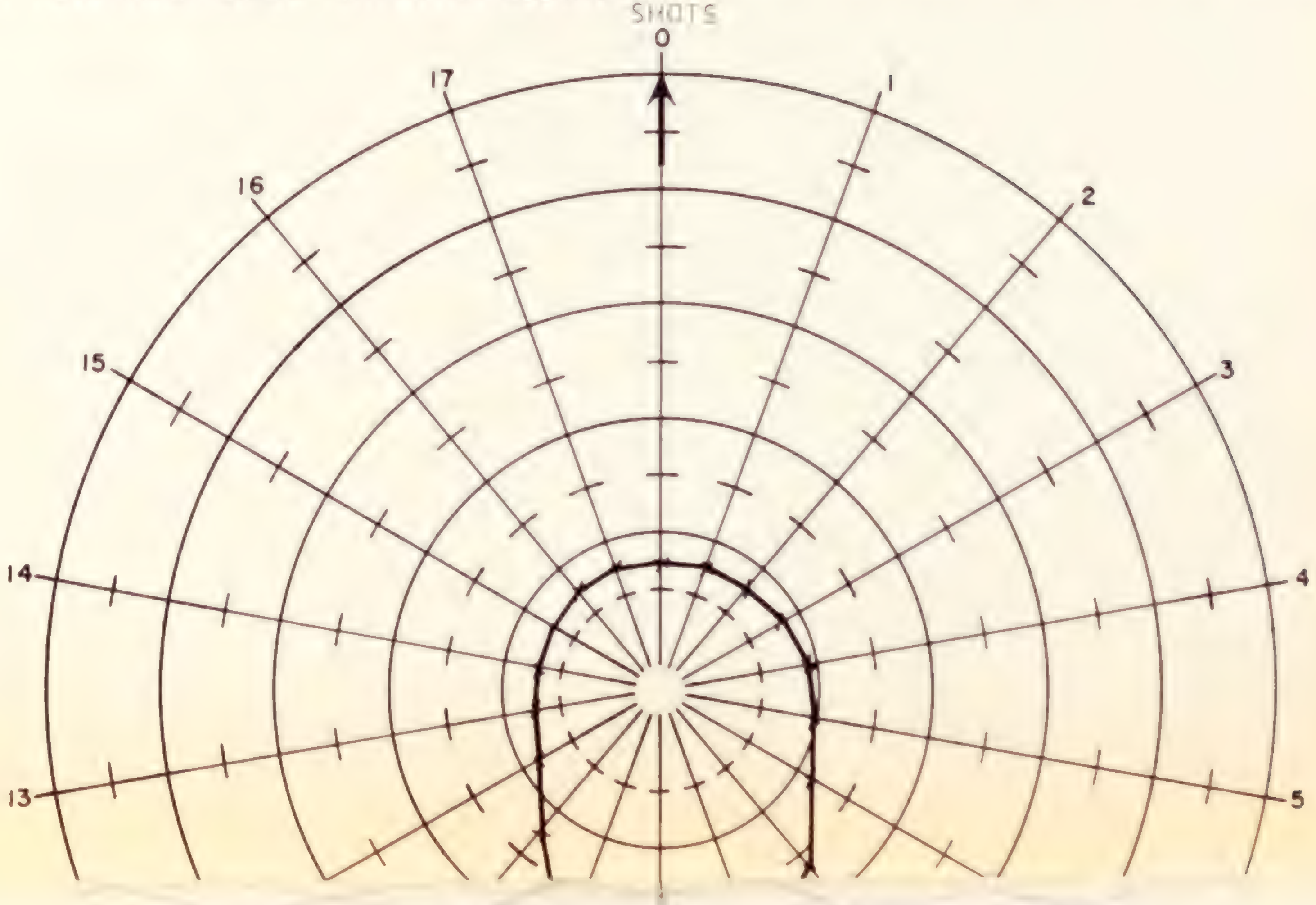


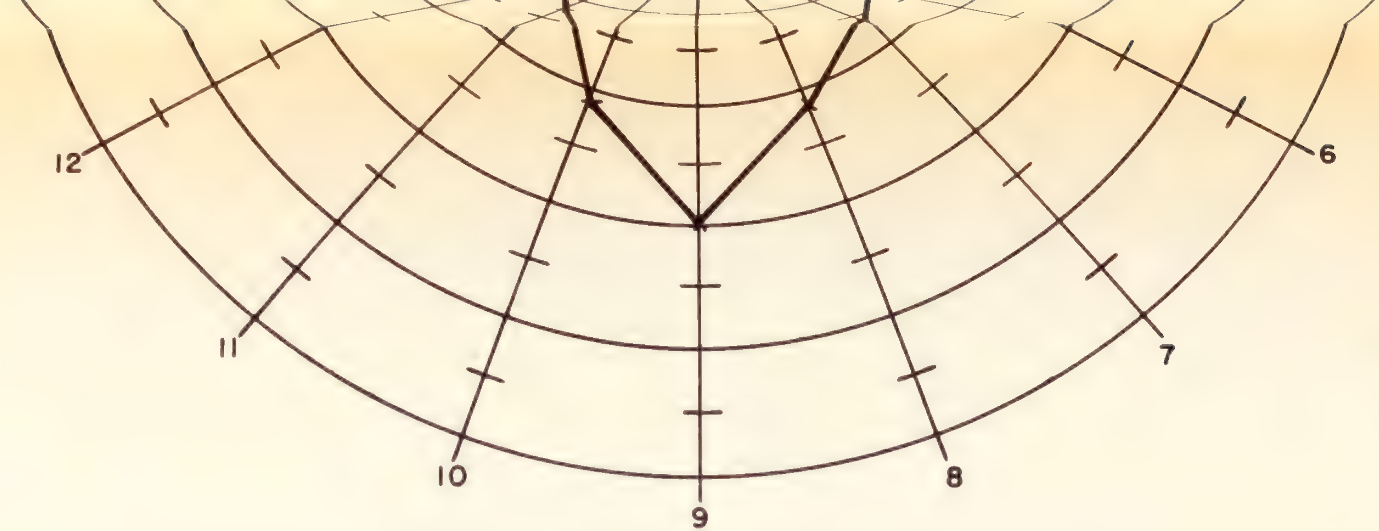


RADIORIENTATION PLOT

POT-B

NO. 2-MIDDLE STRING PERFORATED 1293-1303 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME.
PLOT MADE FROM ABOVE ORIENTING RECORD.





This chart, computation and/or interpretation of our readings from our gamma gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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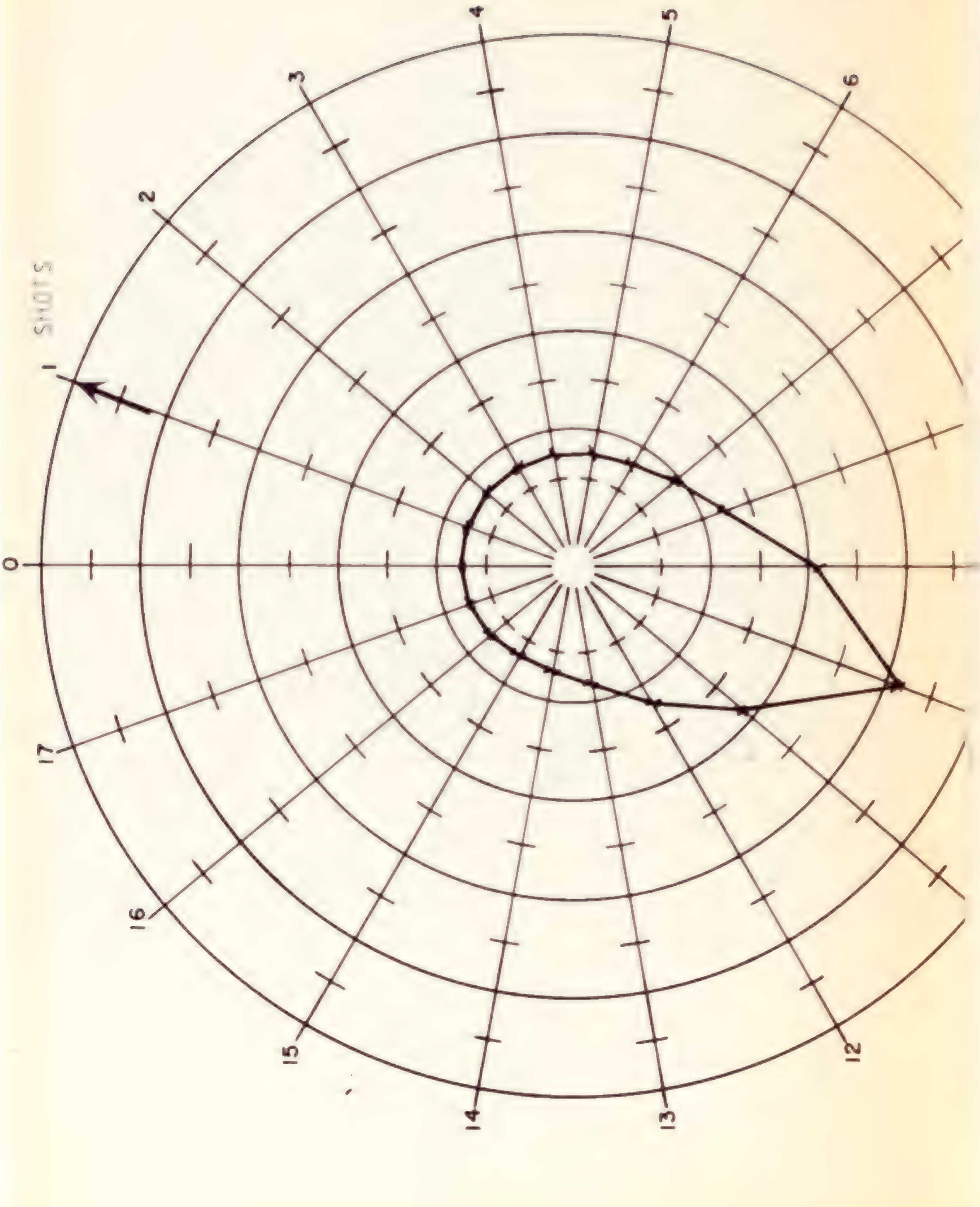
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1279-1289 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME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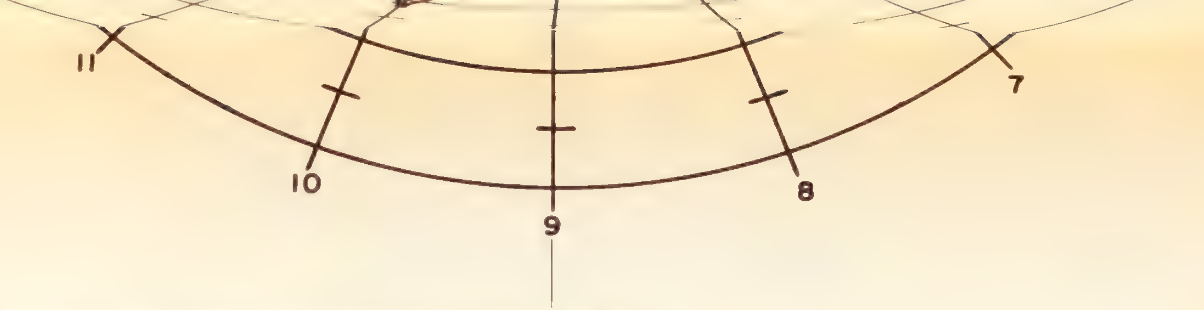

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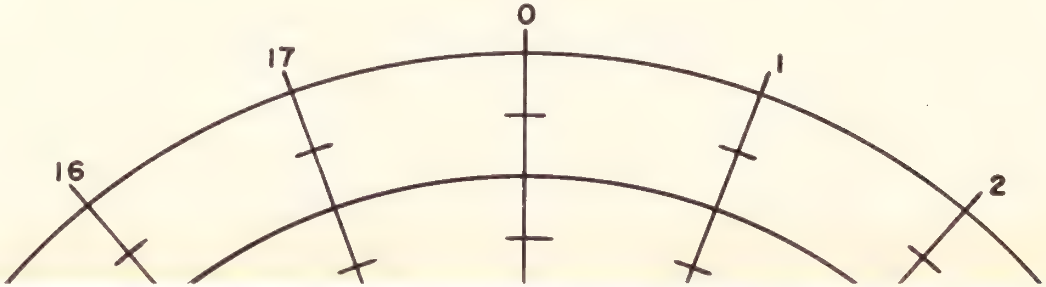
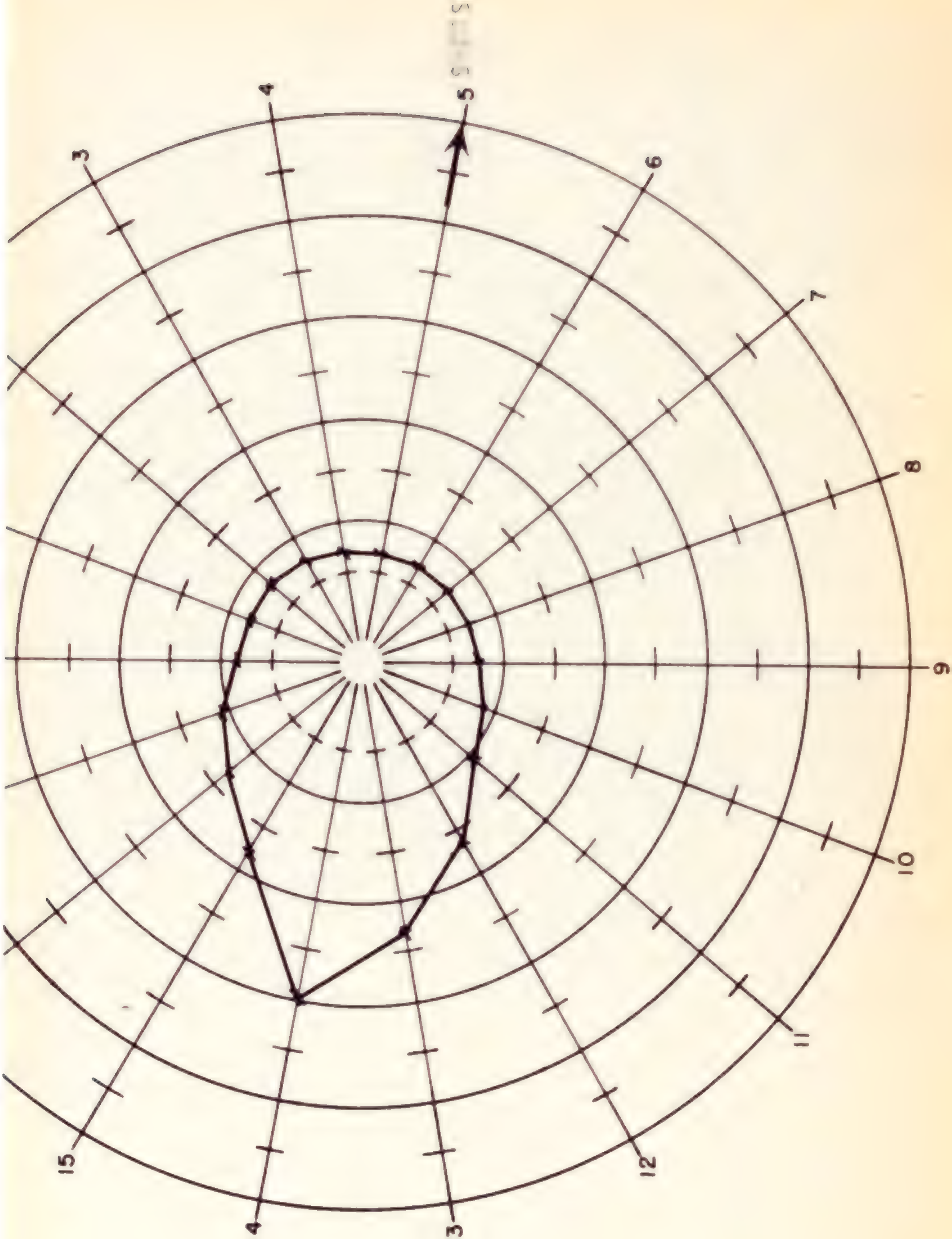
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1268 1278 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

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This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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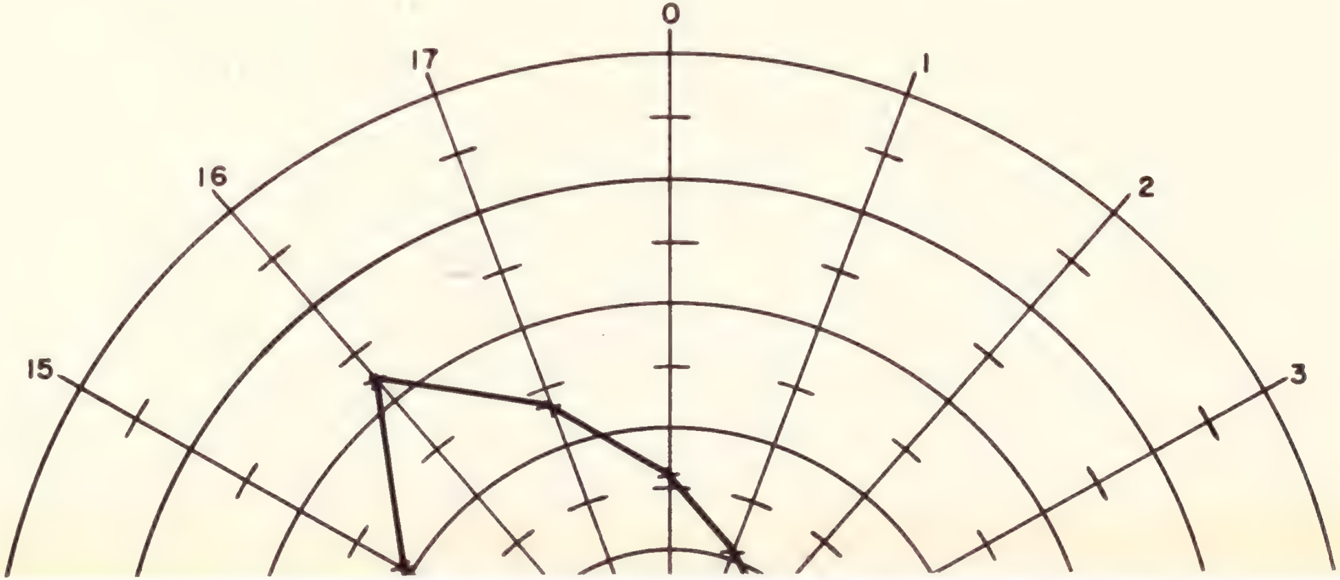
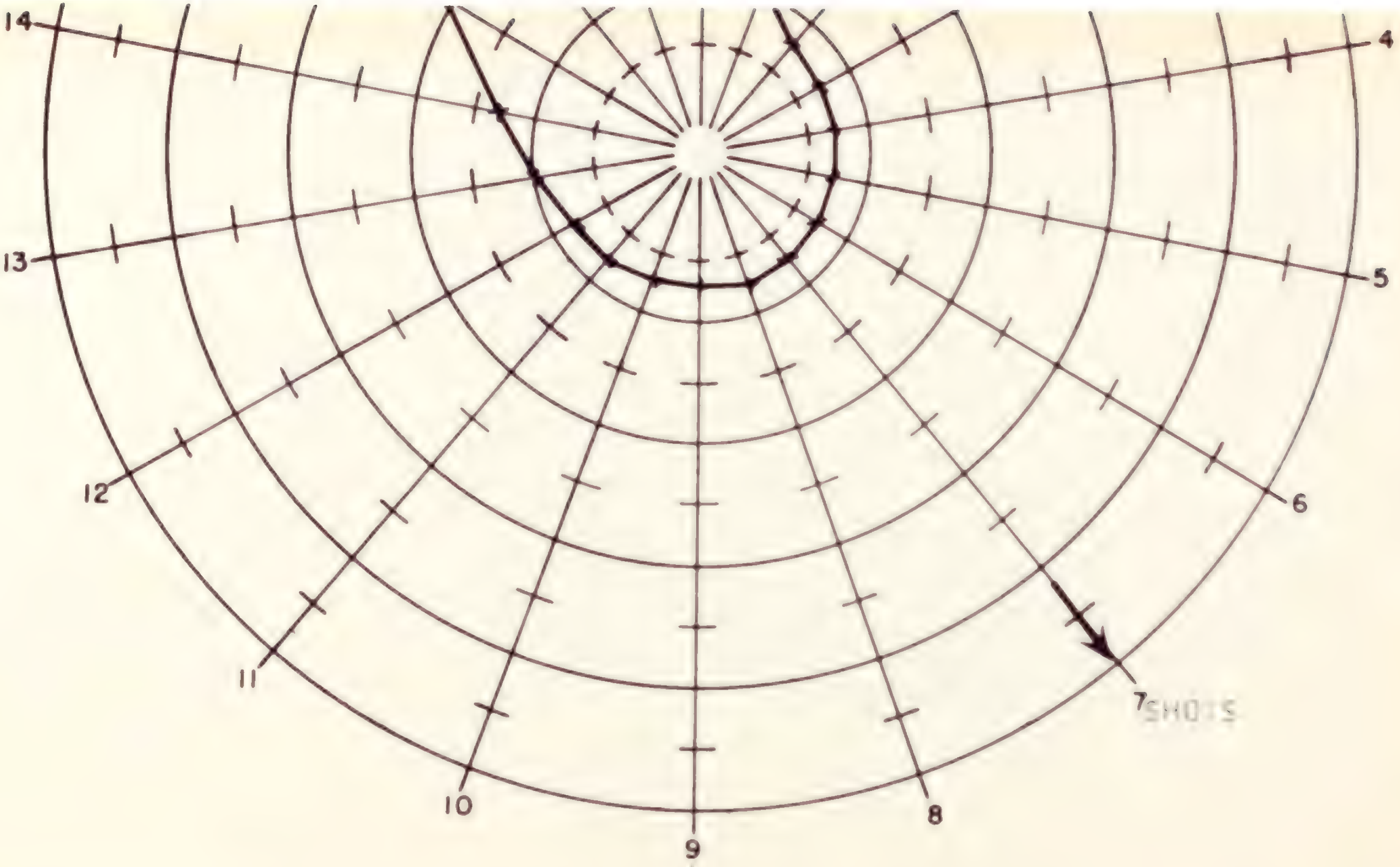
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1257-1267 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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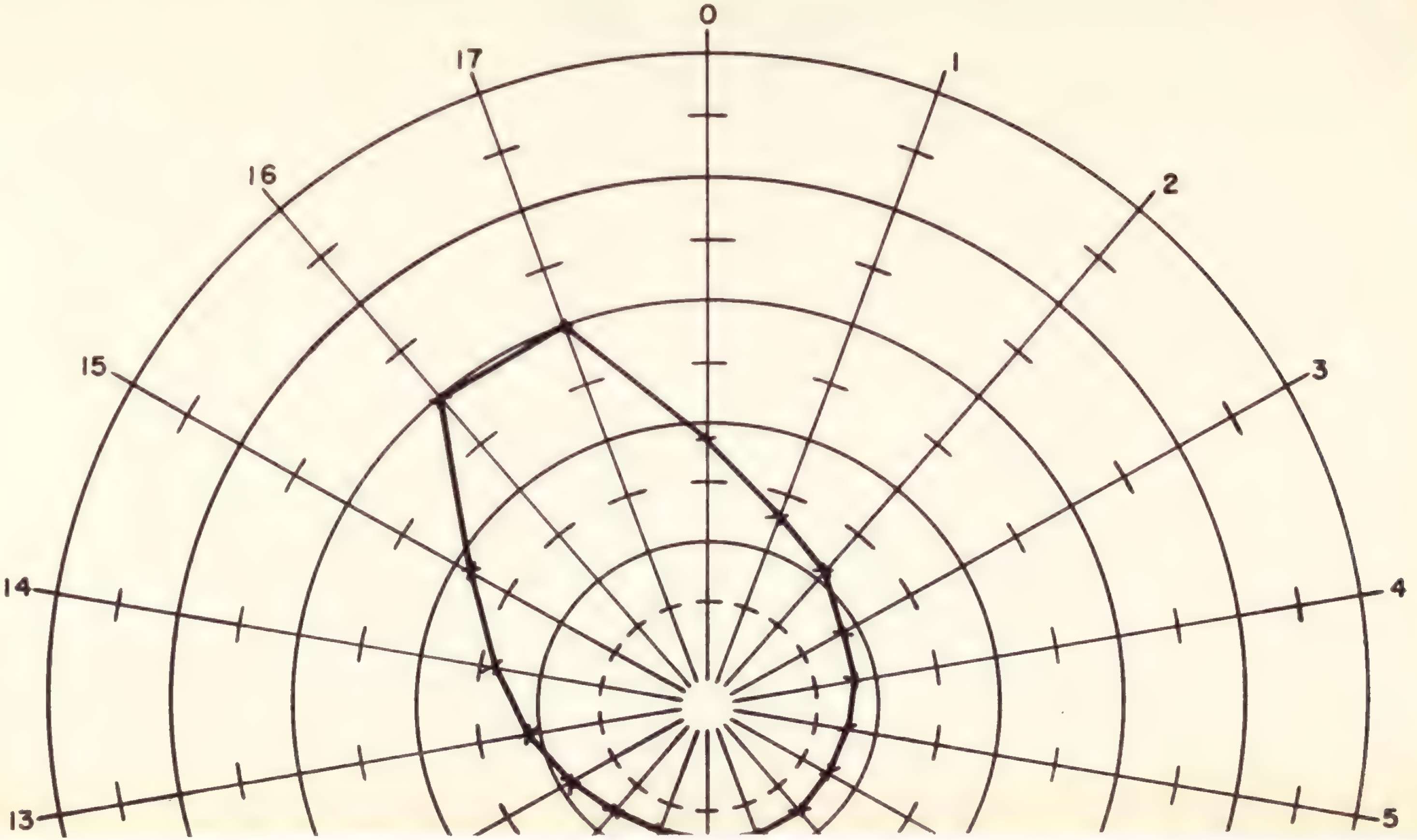
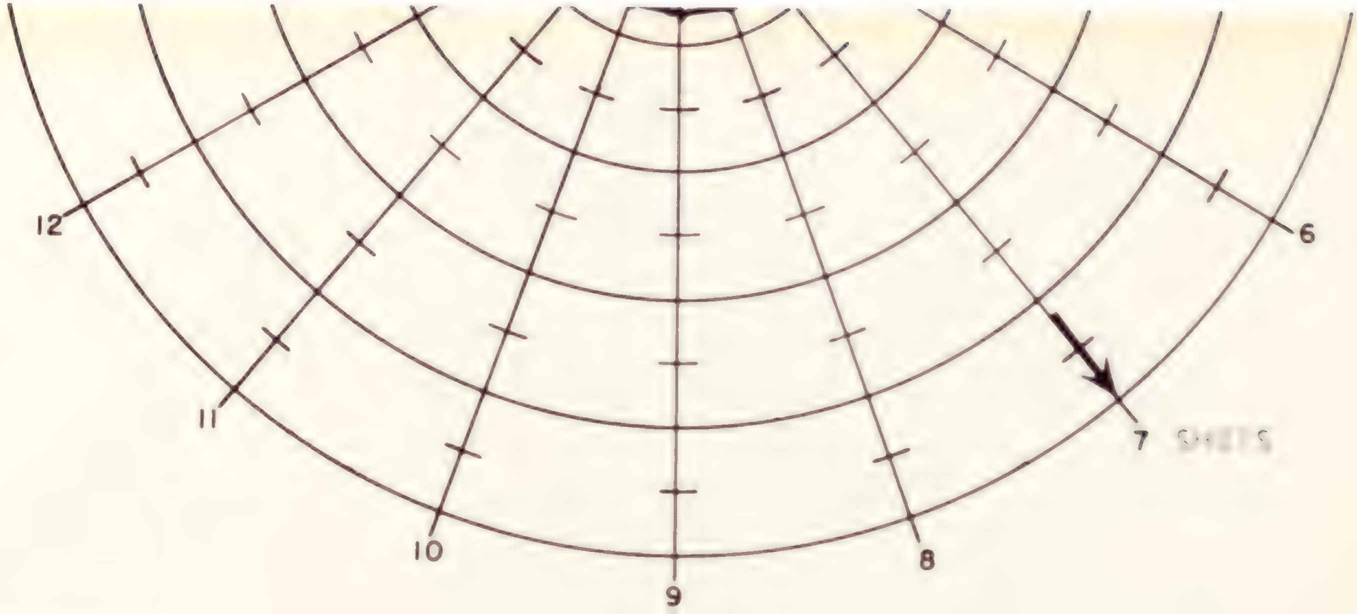
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1246-1256 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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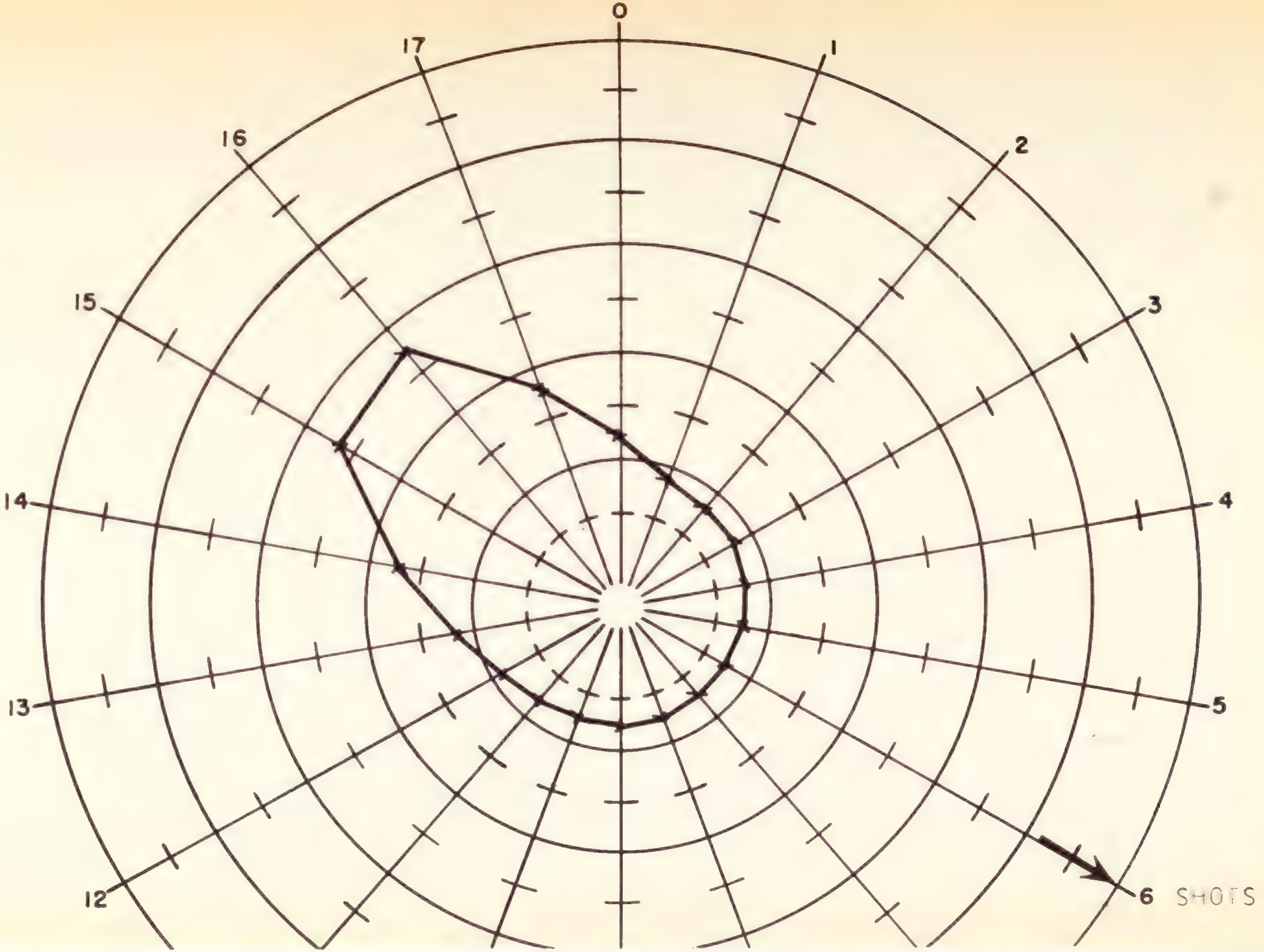
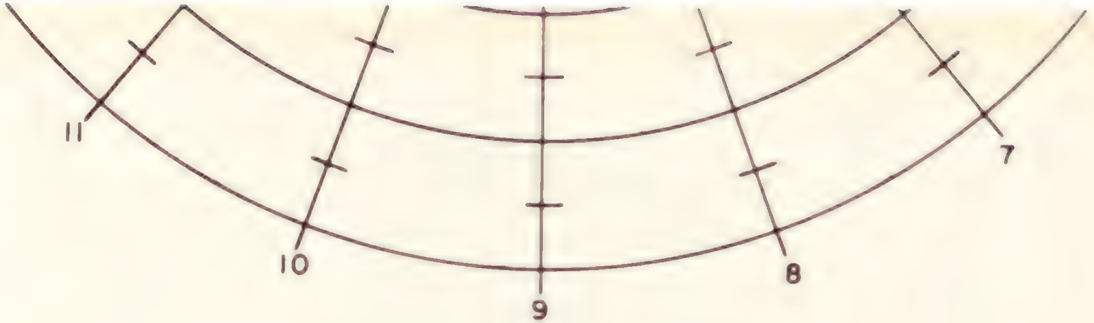
RADIORIENTATION PLOT

POT-B

RADIORIENTATION PLOT

NO. 2 MIDDLE STRING PERFORATED 1235 1245 ONE SHOT PER FOOT WITH 1 11/16 [illegible]





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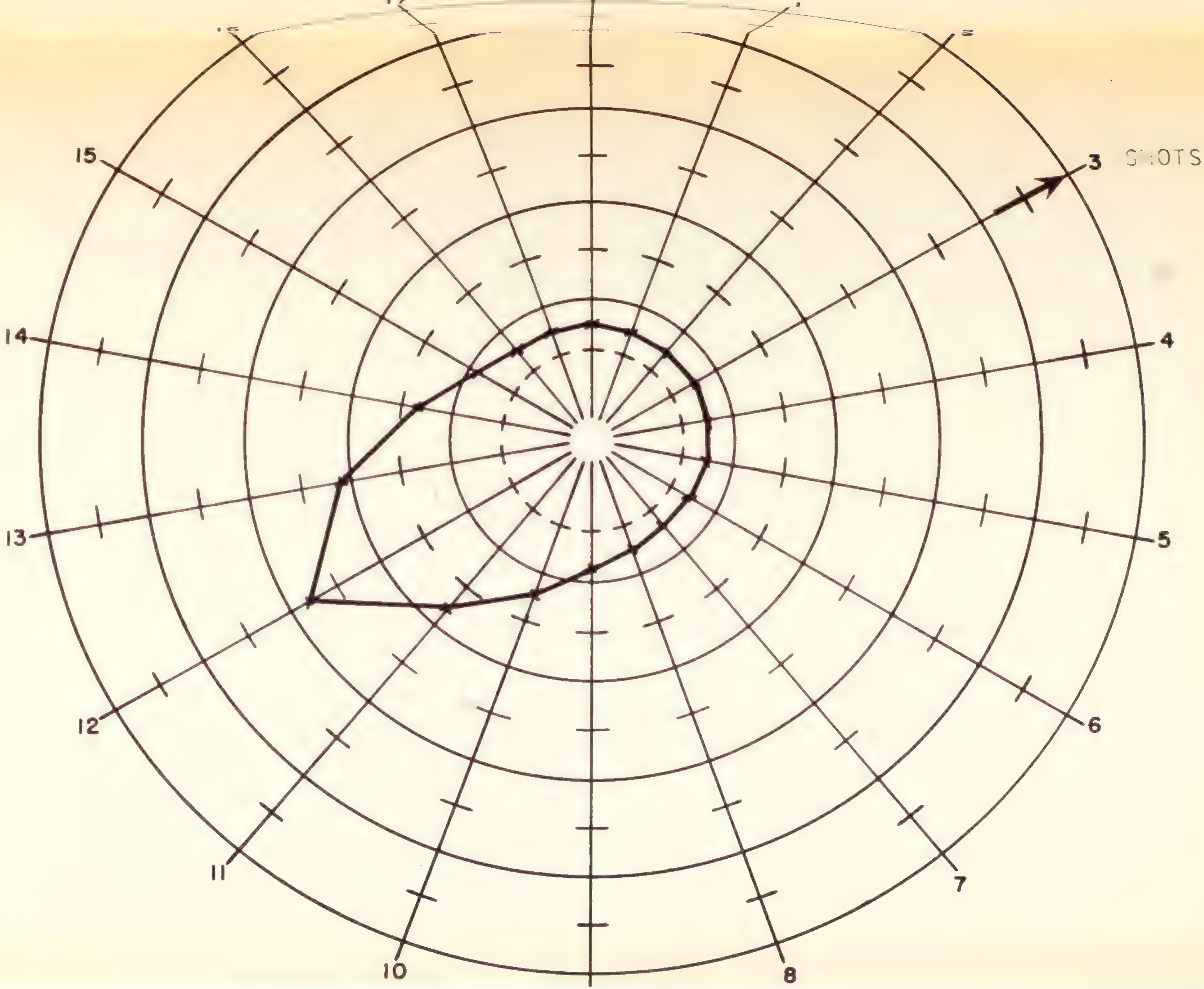
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1224-1234 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


SHOTS
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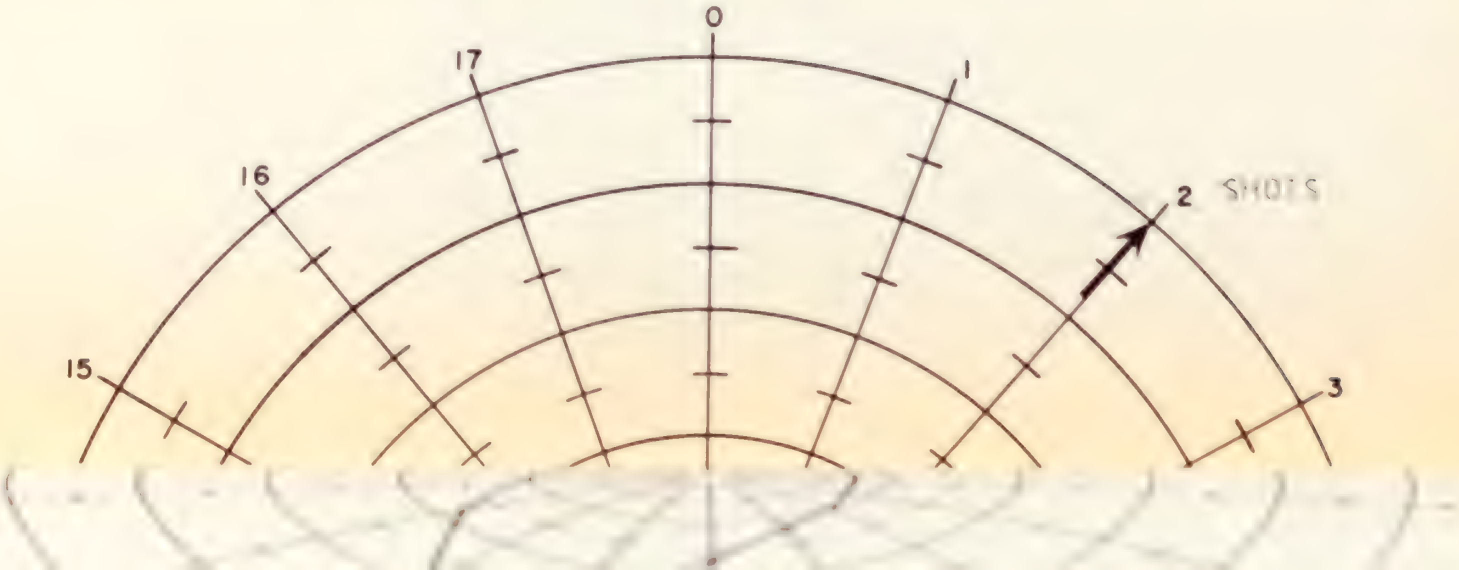
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by unknown metal in the drill hole and other conditions unknown to us.

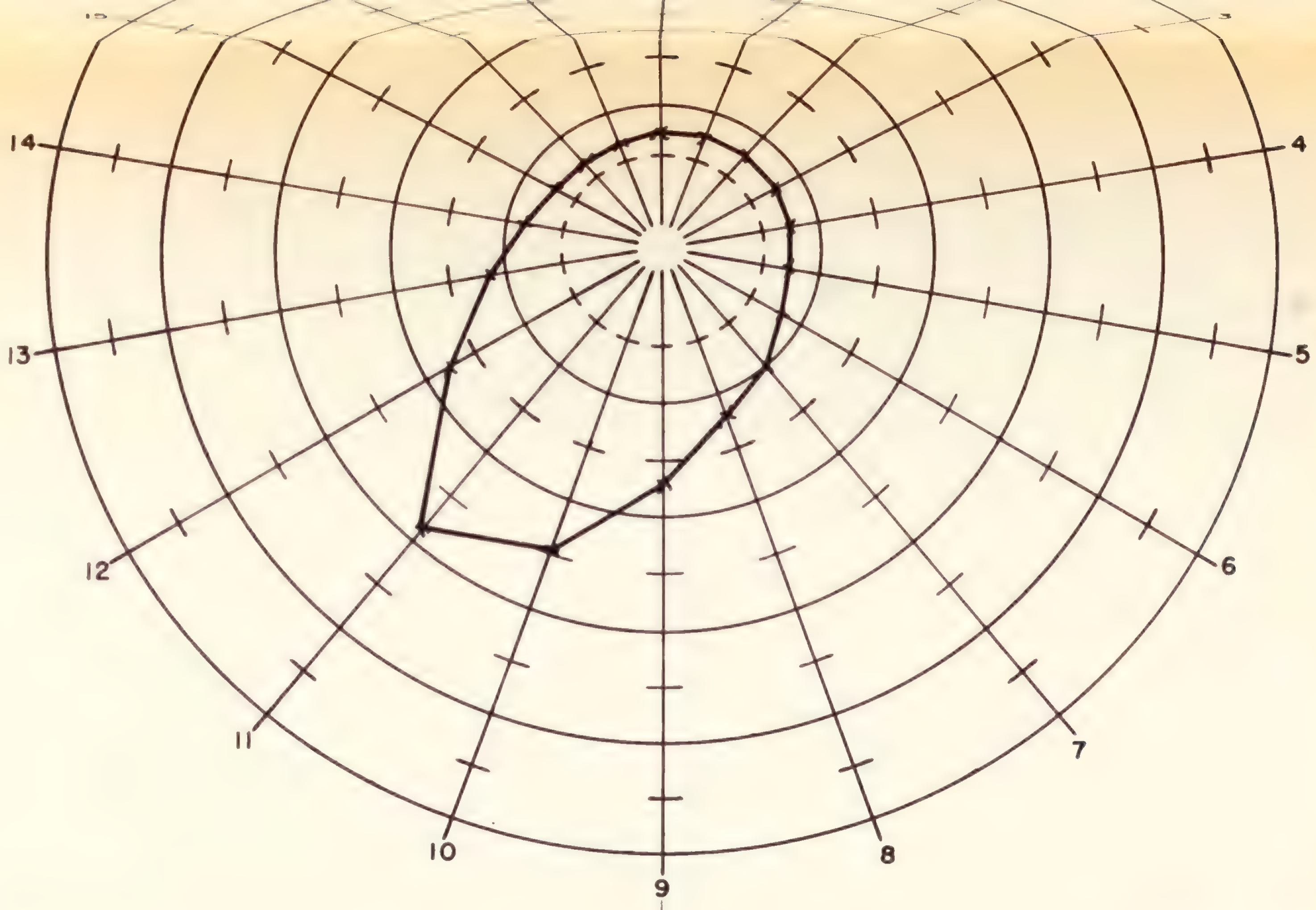
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 2-MIDDLE STRING PERFORATED 1213-1223 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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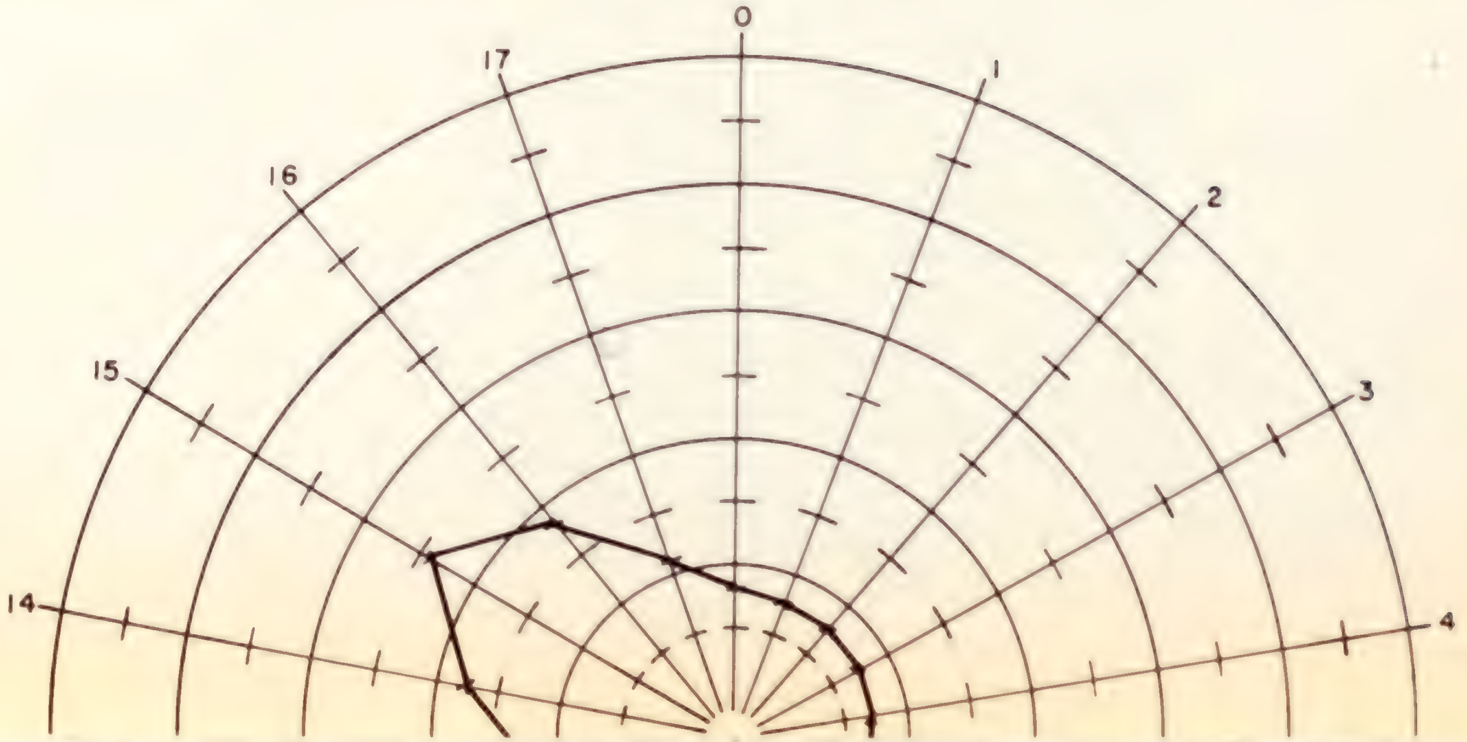
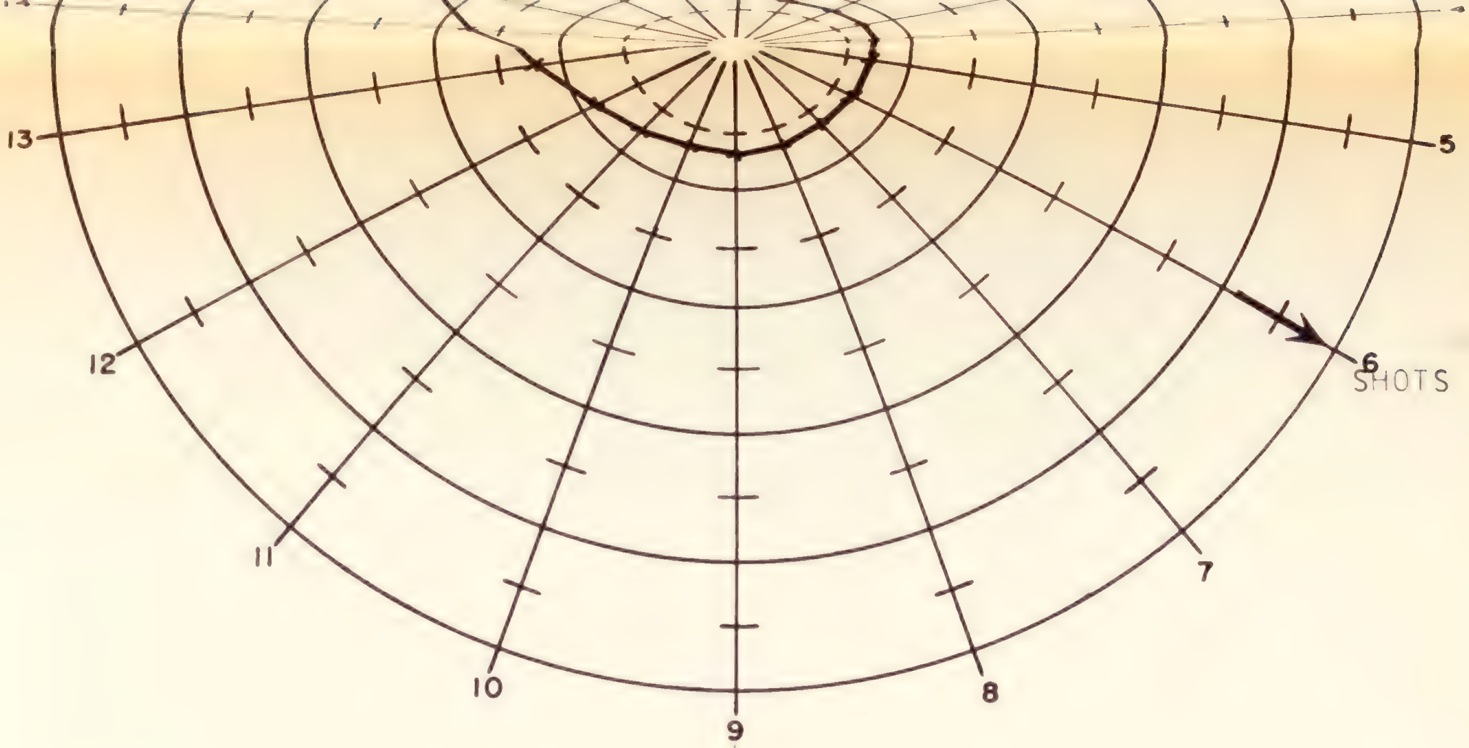
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 2-MIDDLE STRING PERFORATED 1202-1212 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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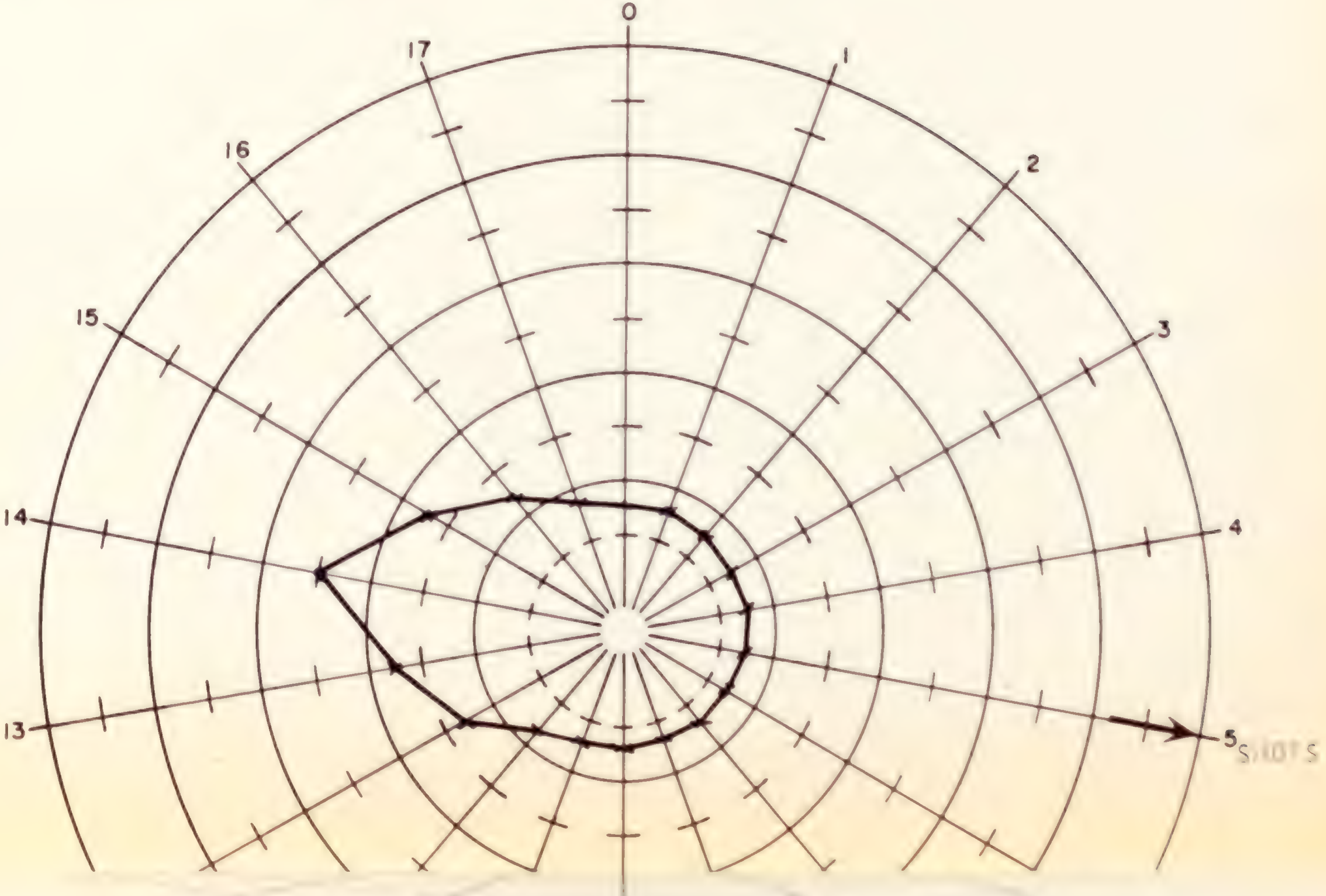
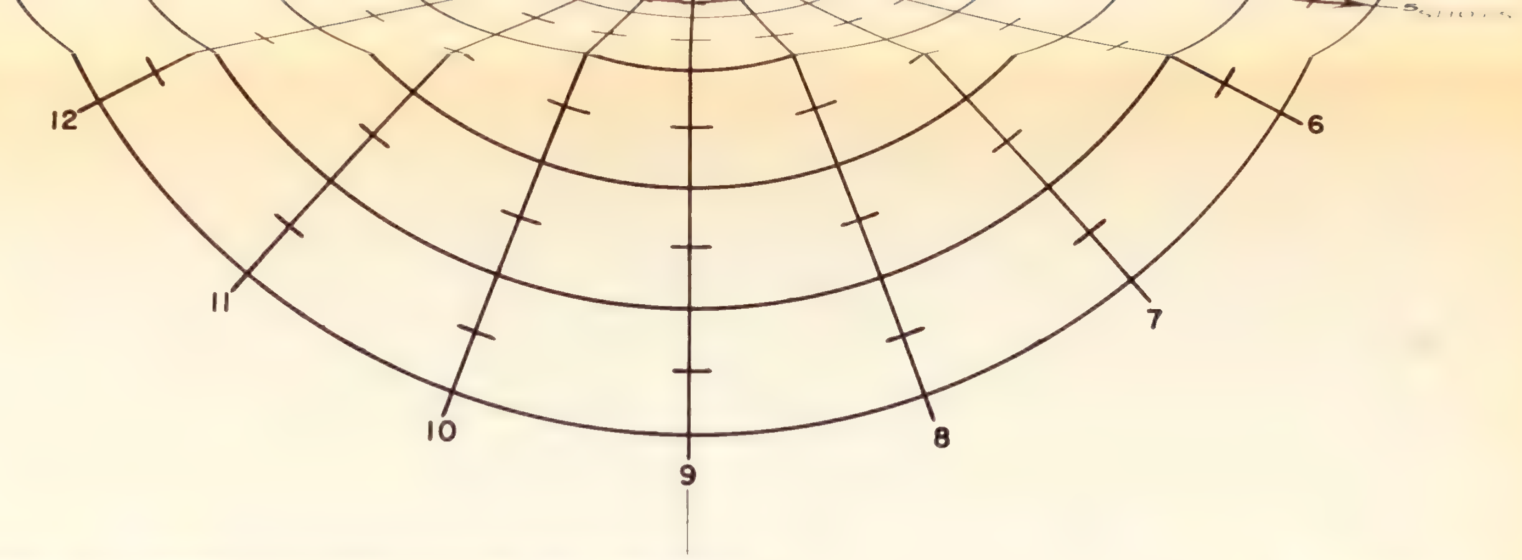
RADIORIENTATION PLOT

POT-B

NO. 2-MIDDLE STRING PERFORATED 1191-1201 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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RADIORIENTATION PLOT

POT-B

NO.2·MIDDLE STRING PERFORATED 1180-1190 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

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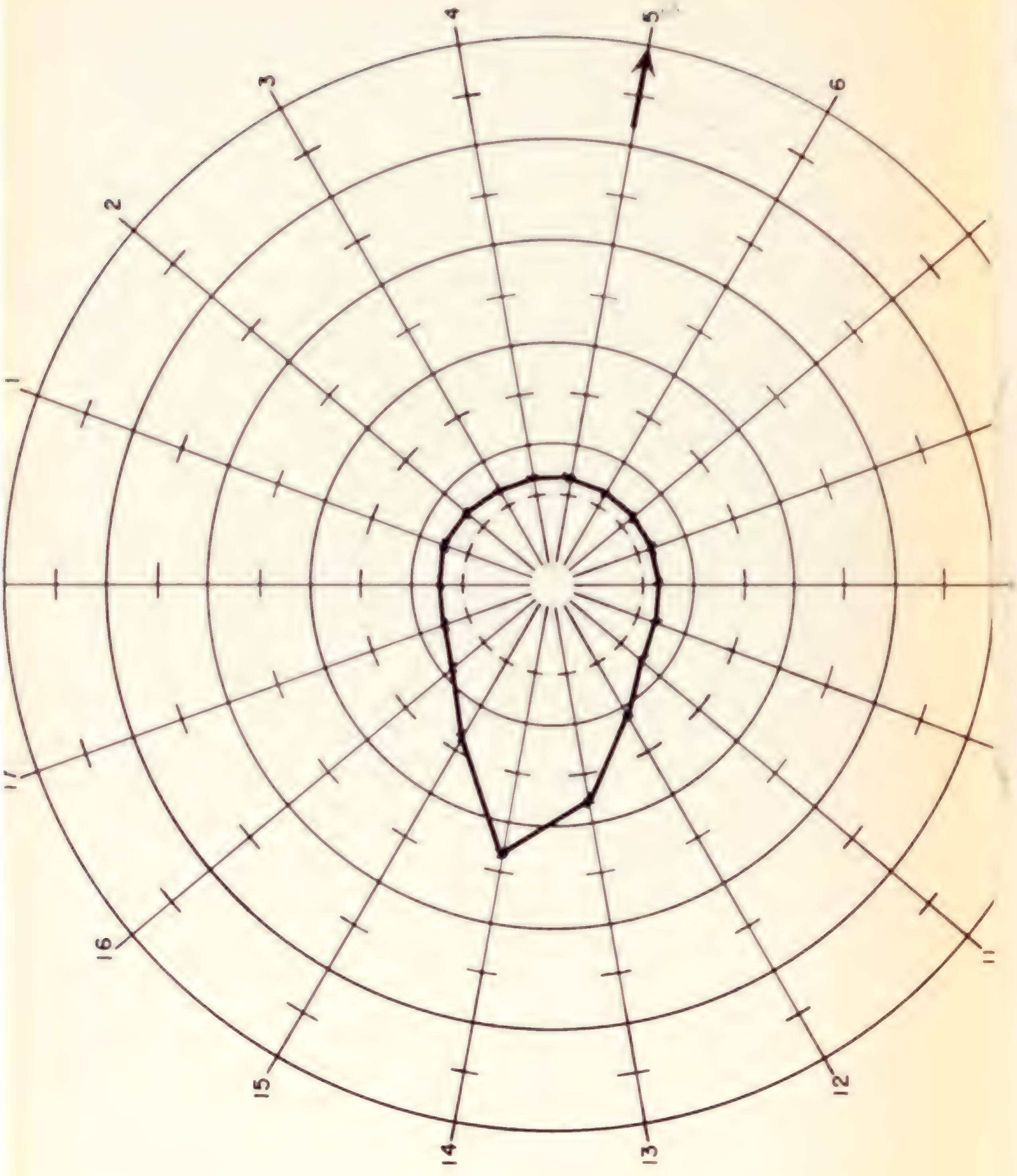
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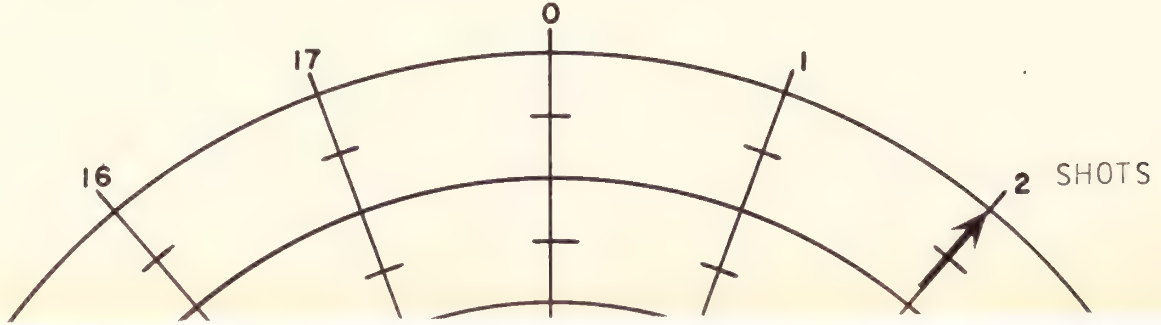
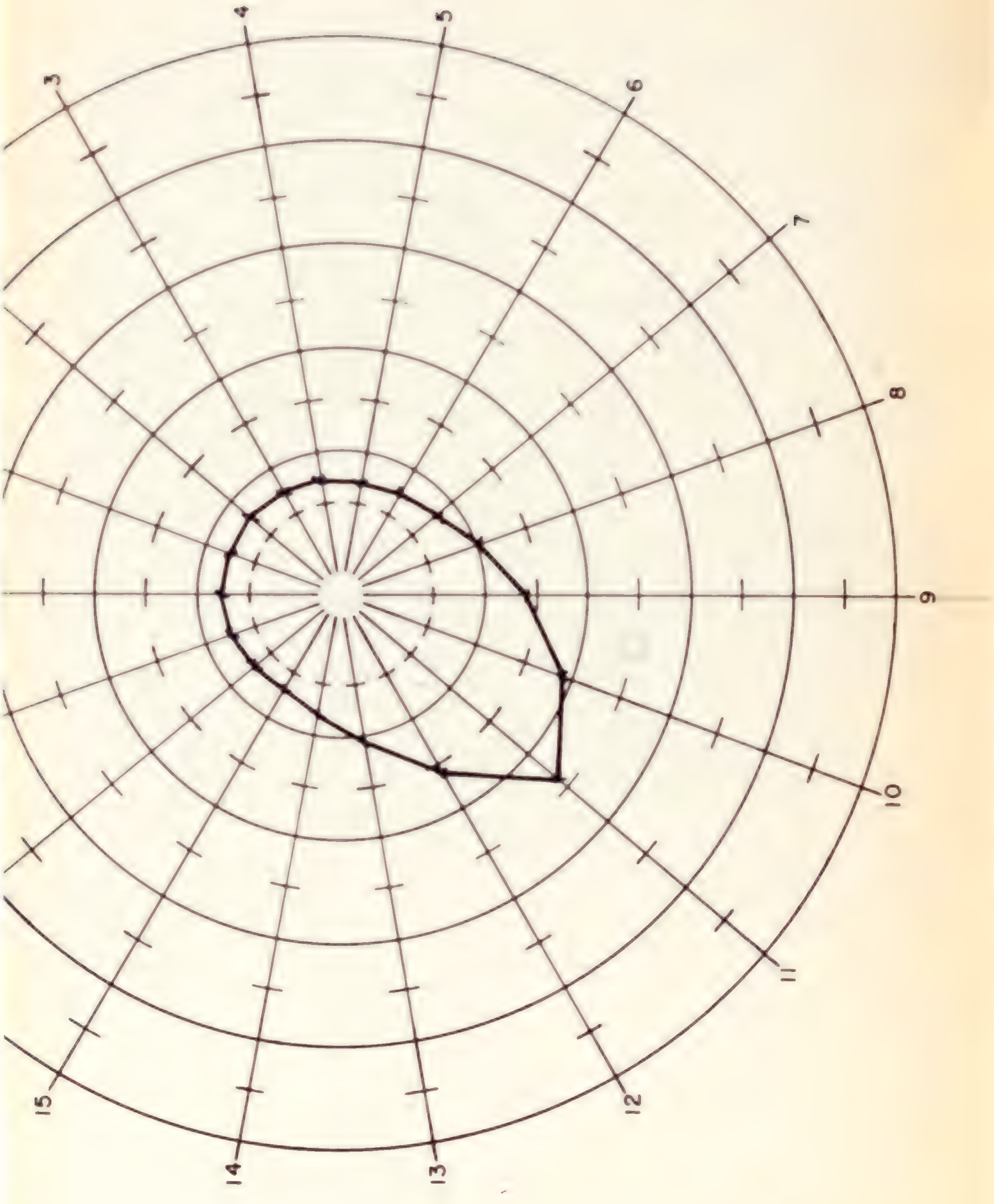
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1169-1179 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

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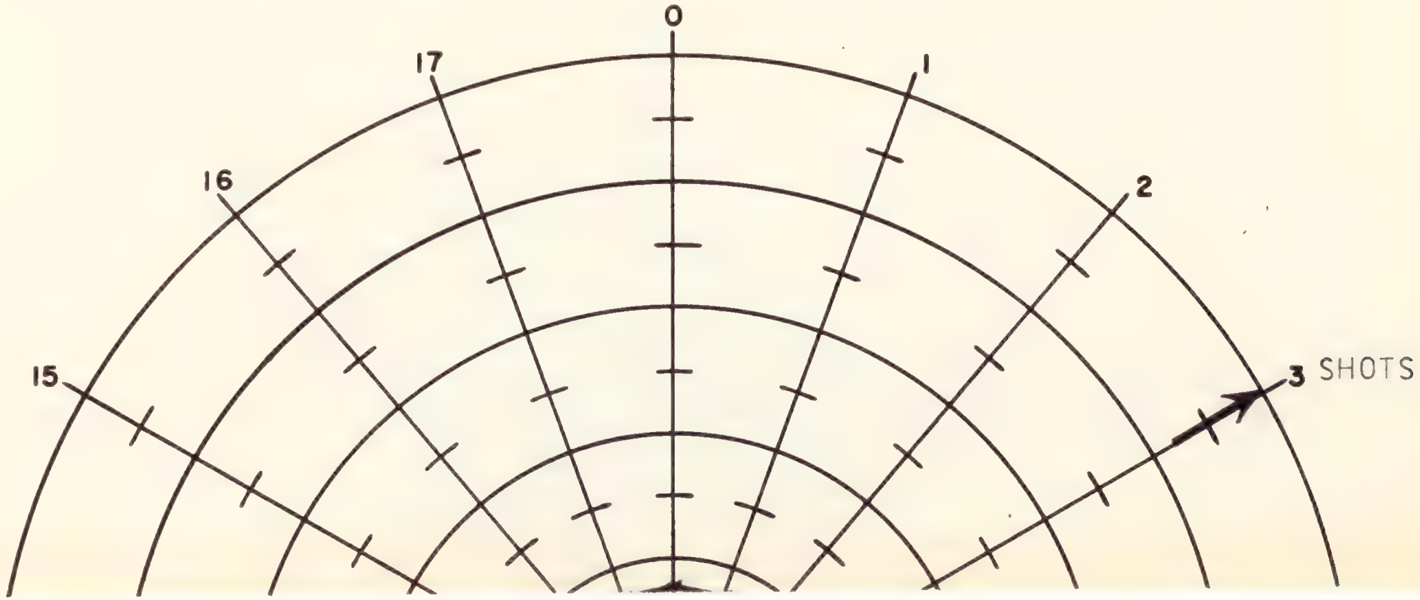
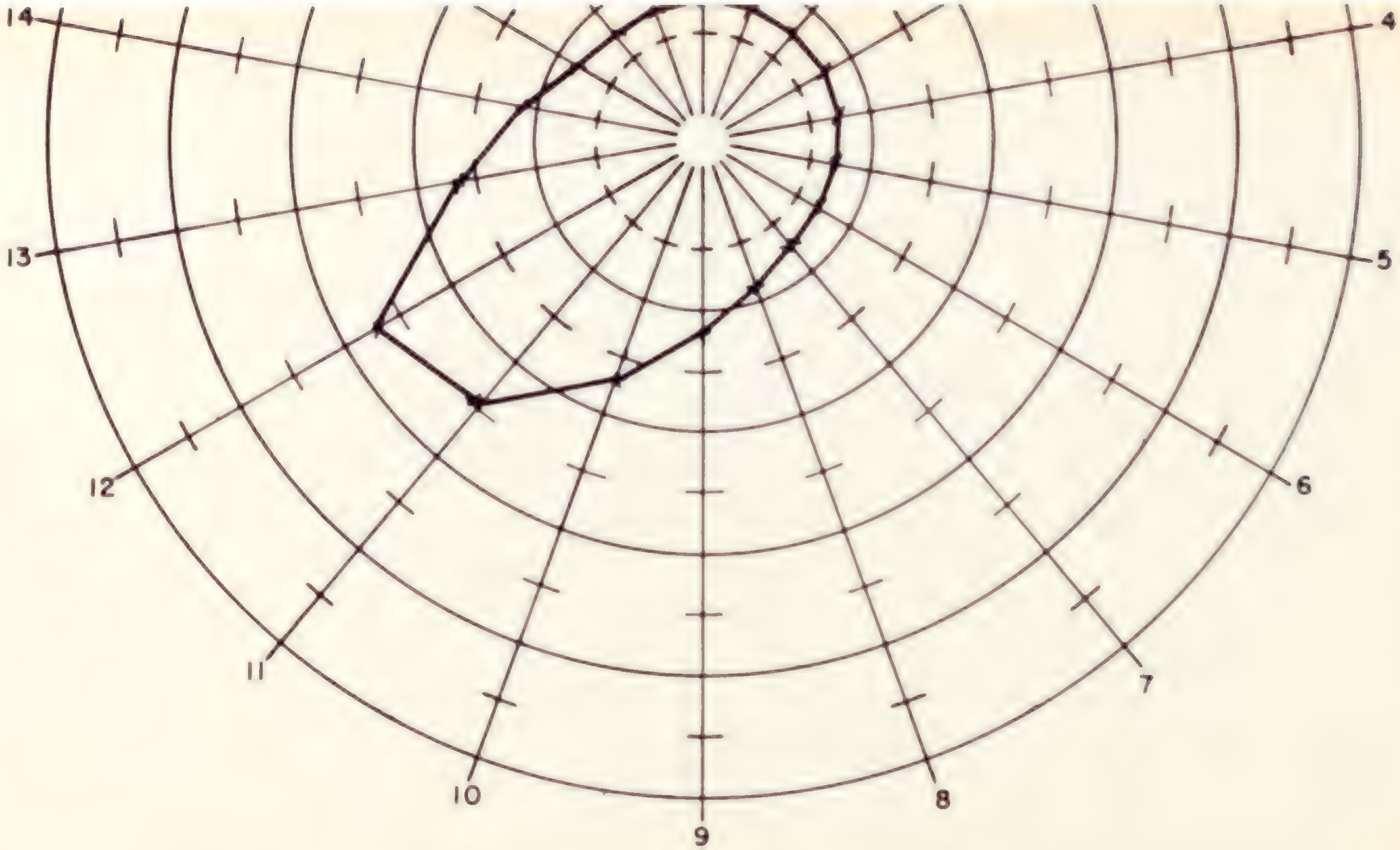
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1158-1168 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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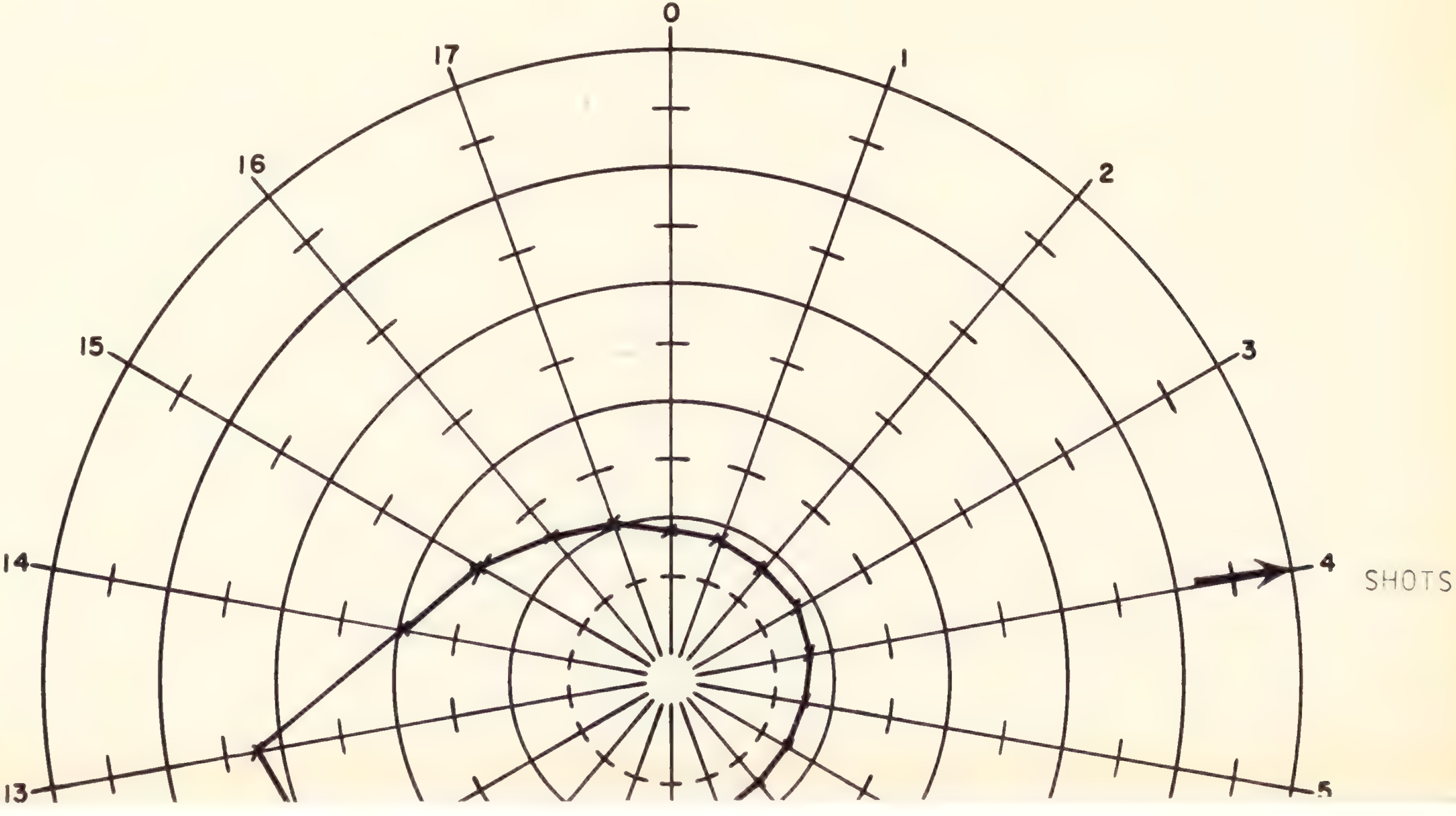
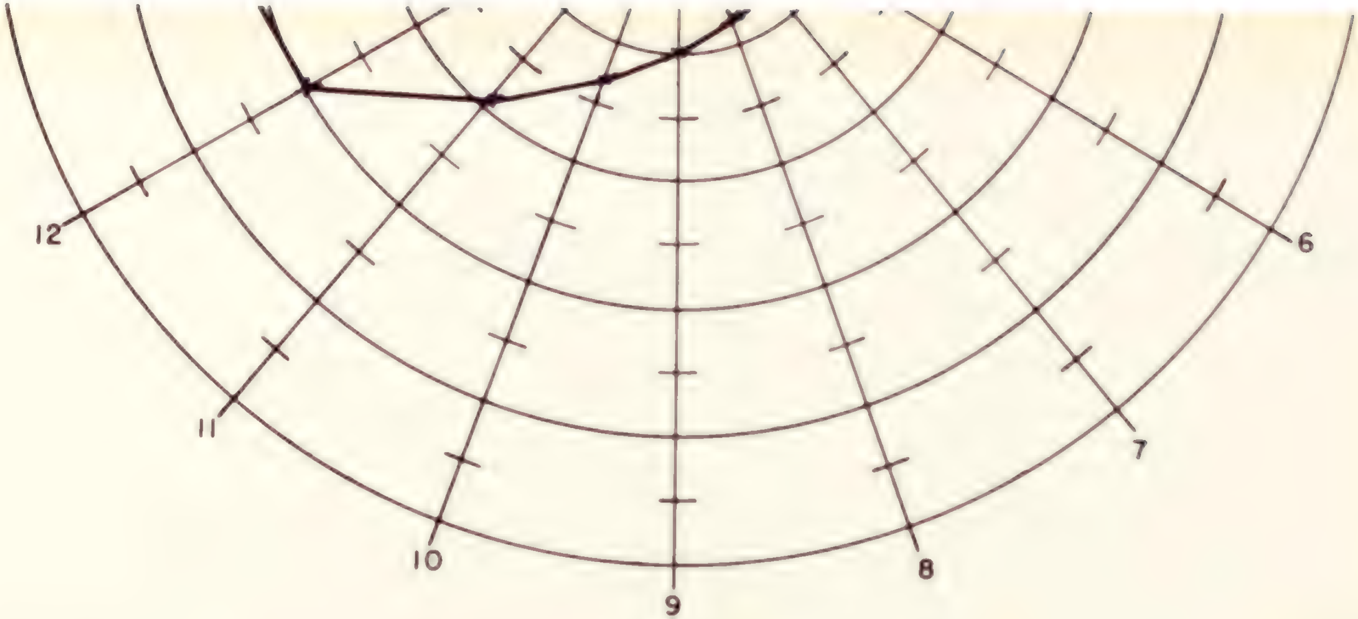
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1147-1157 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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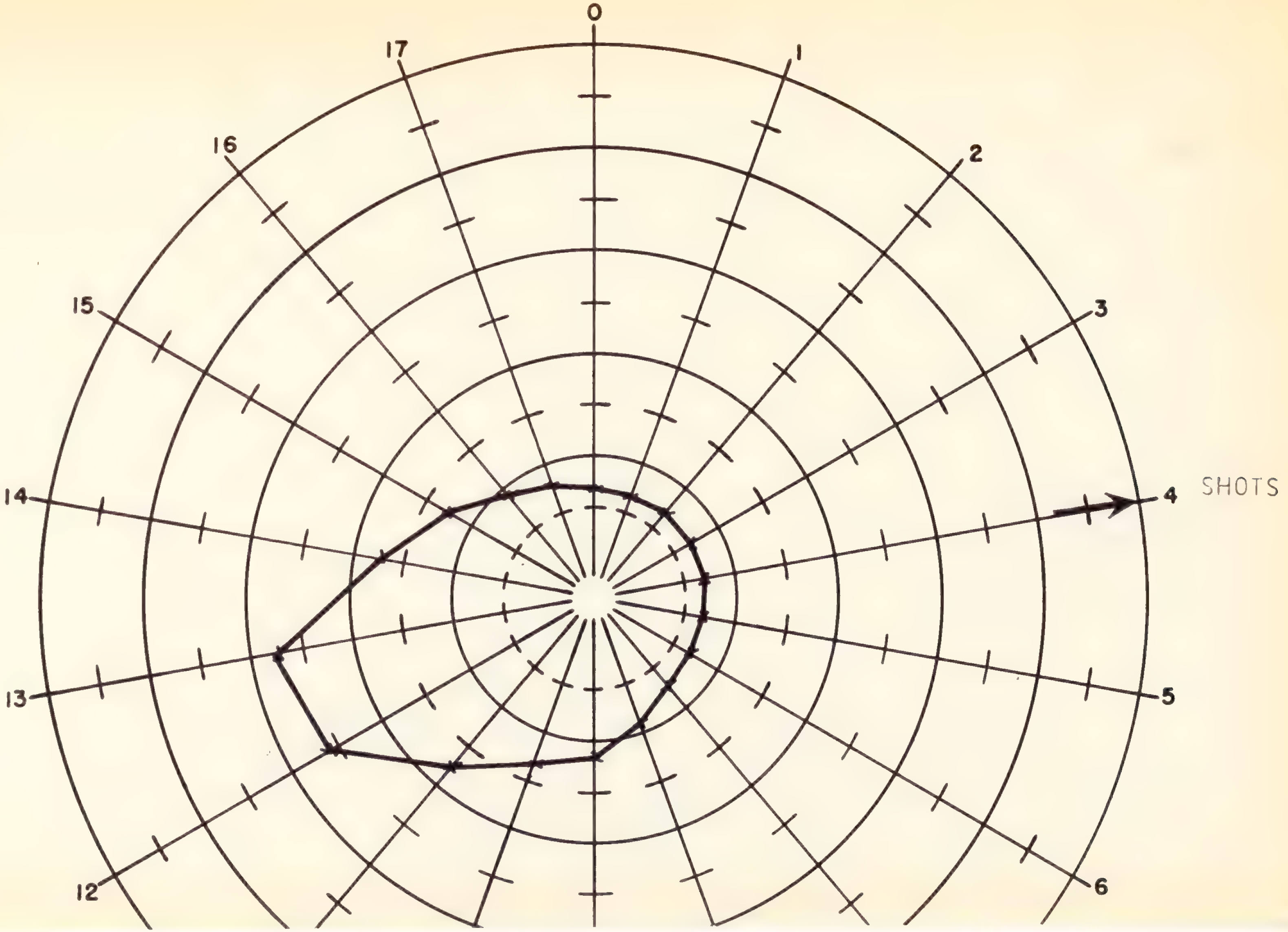
RADIORIENTATION PLOT

POT-B

RADIORIENTATION PLOT

NO.2 MIDDLE STRING PERFORATED 1136 1146 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME



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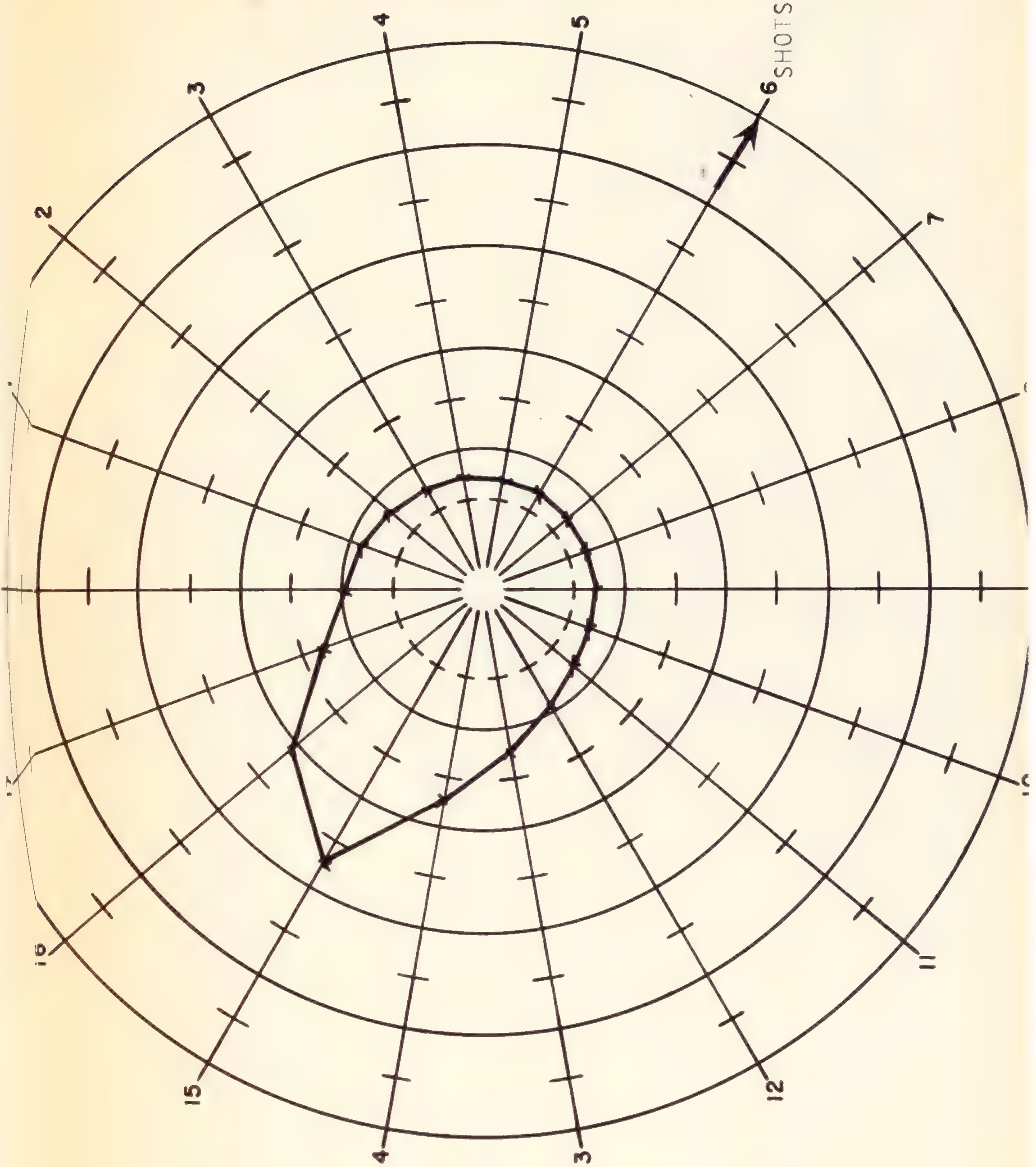
RADIORIENTATION PLOT

POT-B

NO. 2-MIDDLE STRING PERFORATED 1125-1135 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


0
1
2
3
4
5
6
SHOTS
7
10
11
12
13
14
15
16
17

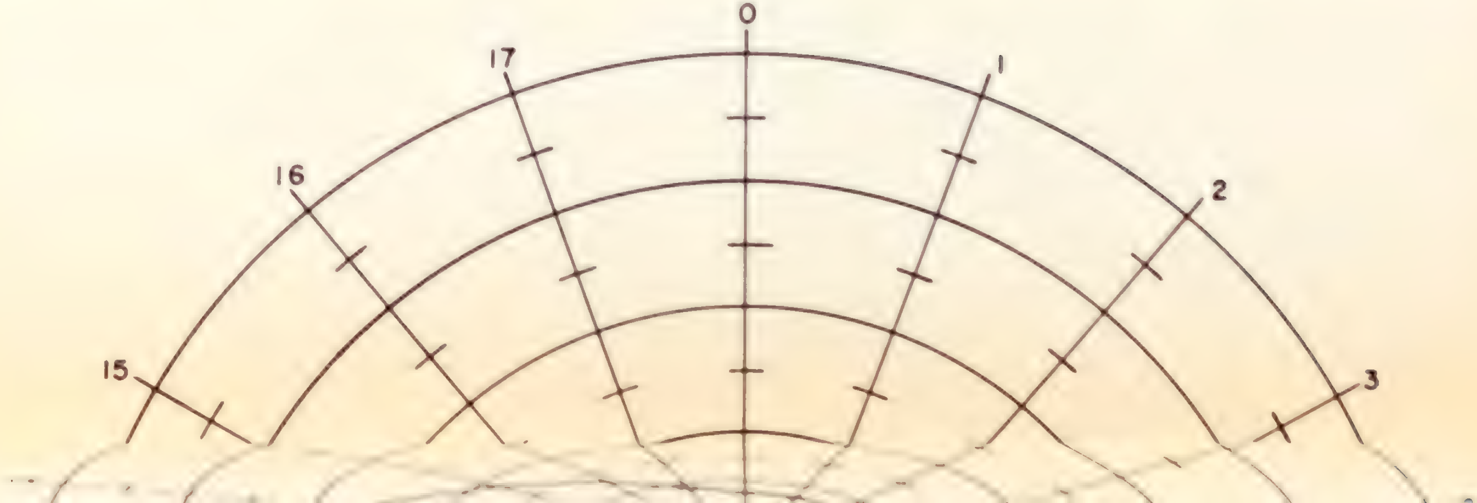
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by [illegible] metal in the drill hole and other conditions unknown to us.

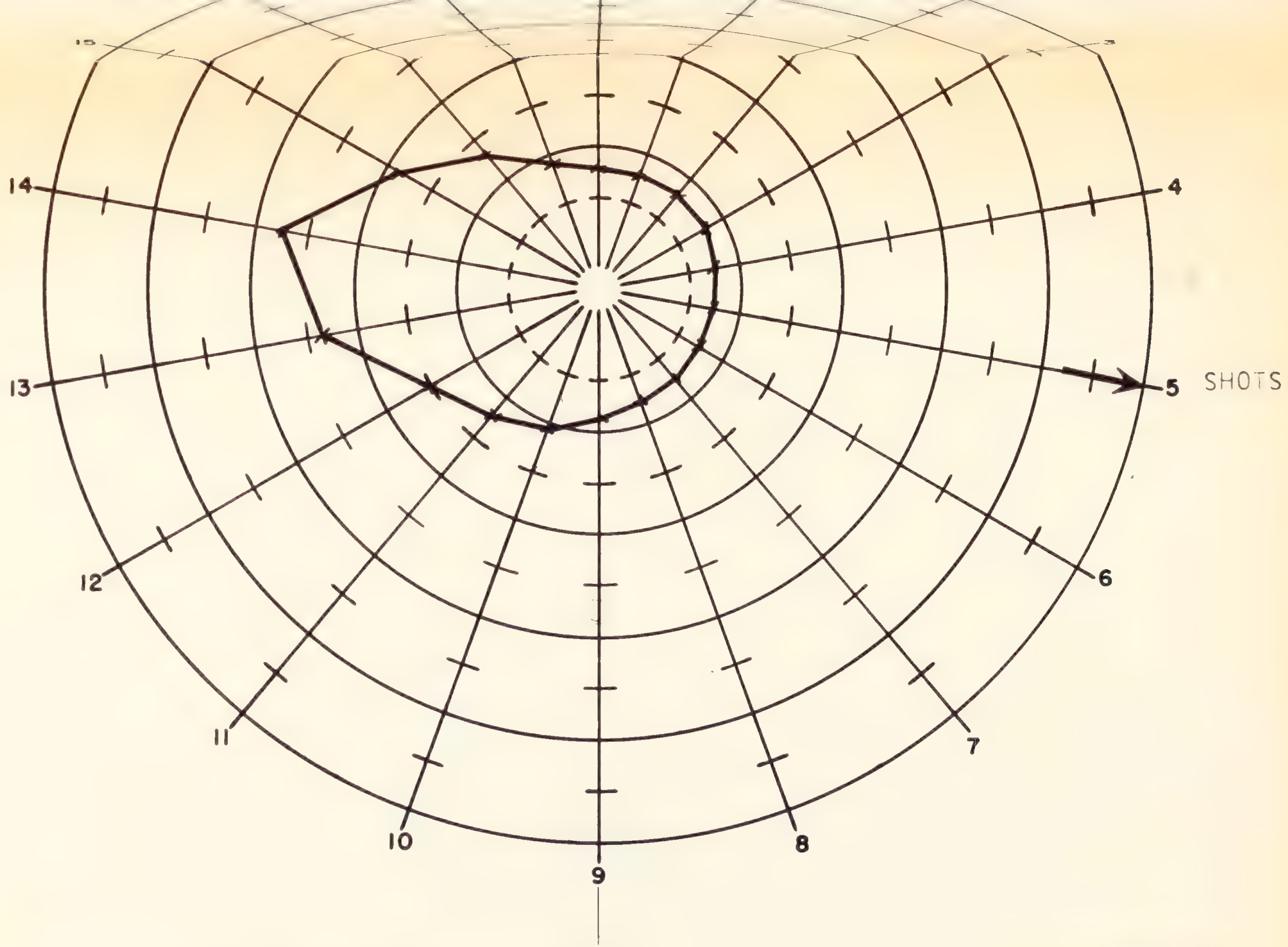
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1114-1124 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





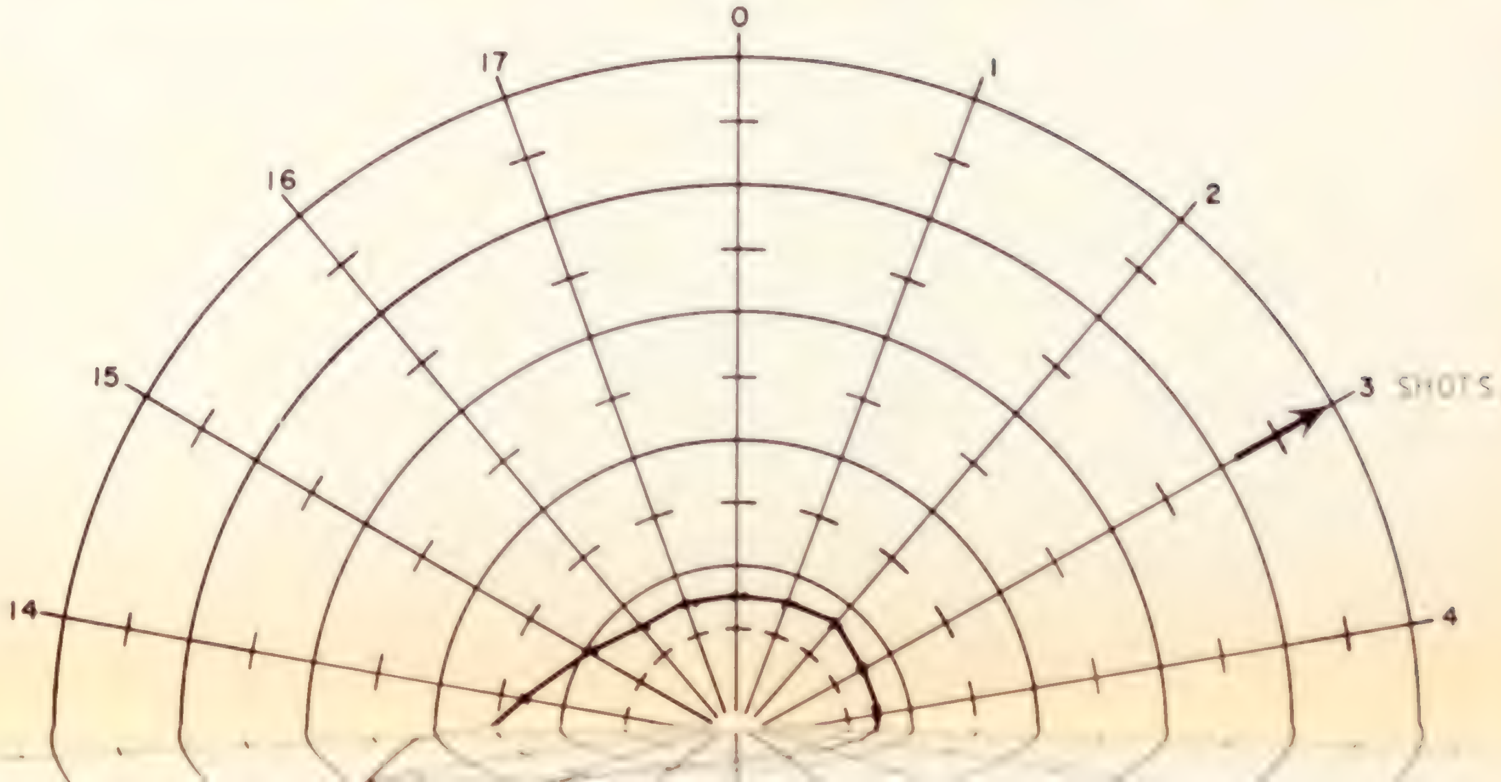
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

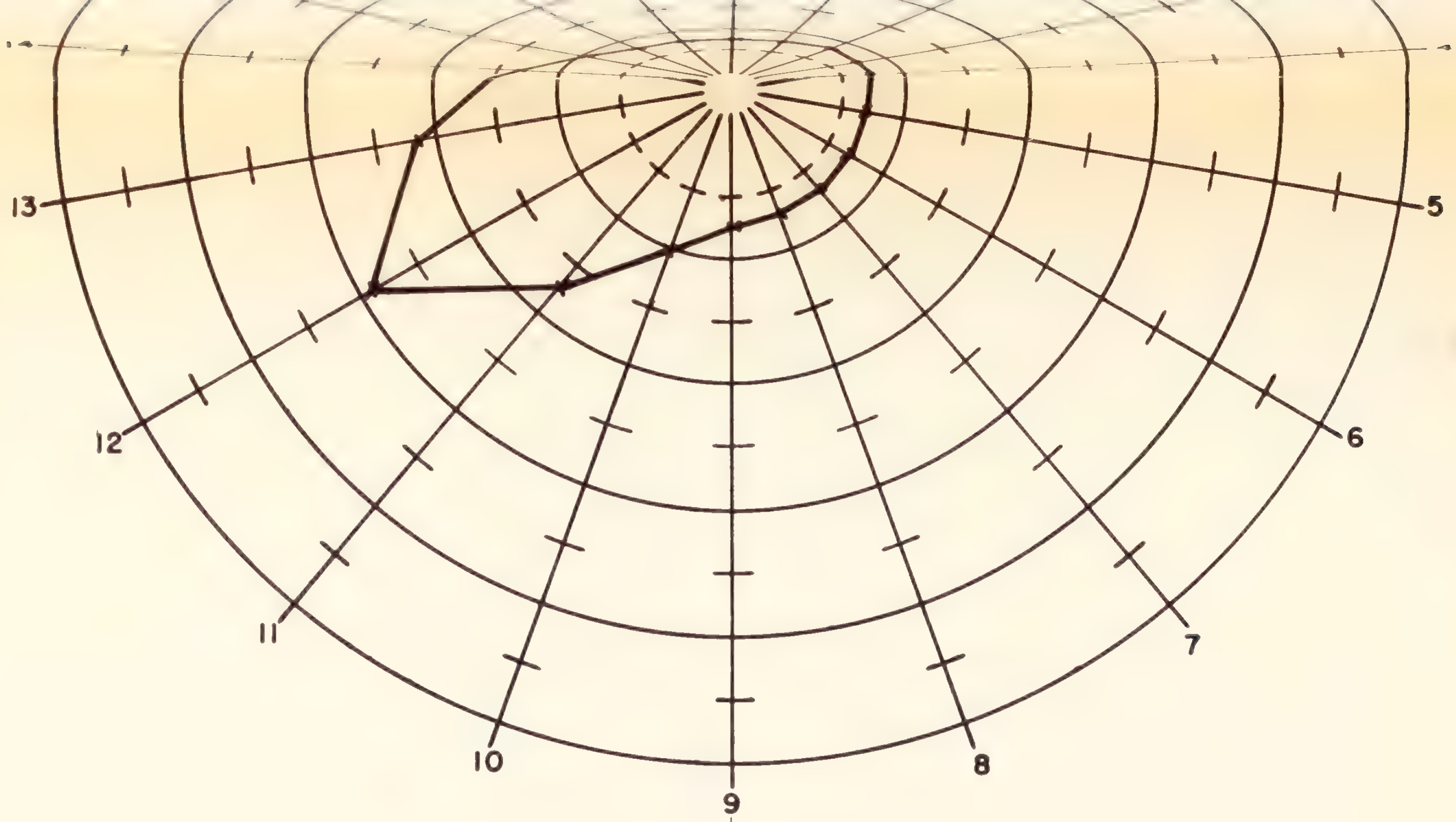
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 2-MIDDLE STRING PERFORATED 1103-1113 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





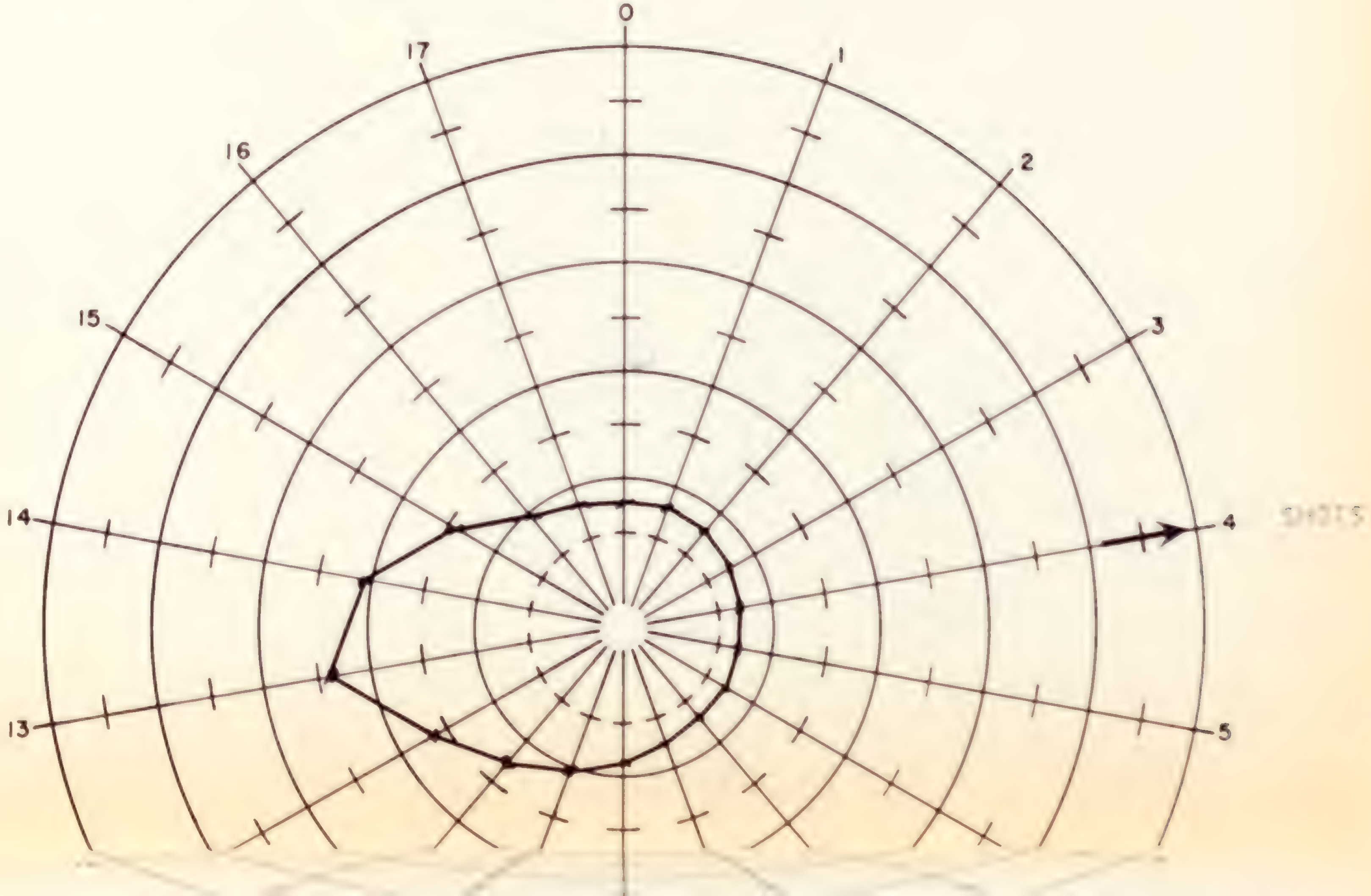
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

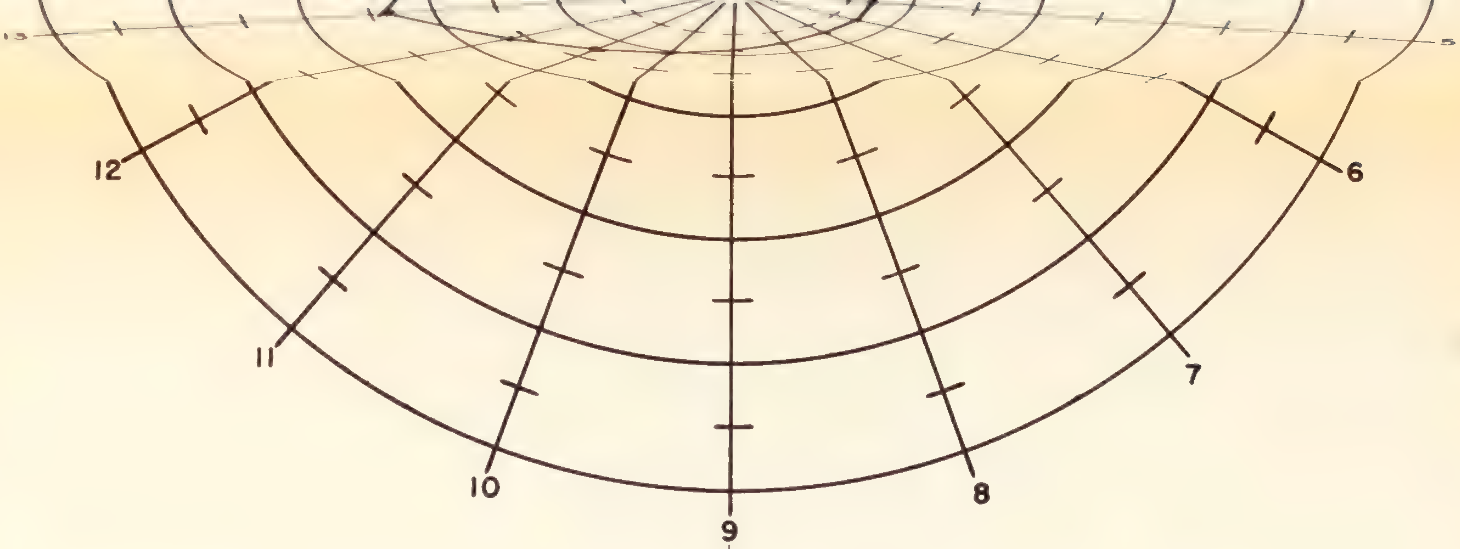
Schlumberger

RADIORIENTATION PLOT

POT-B

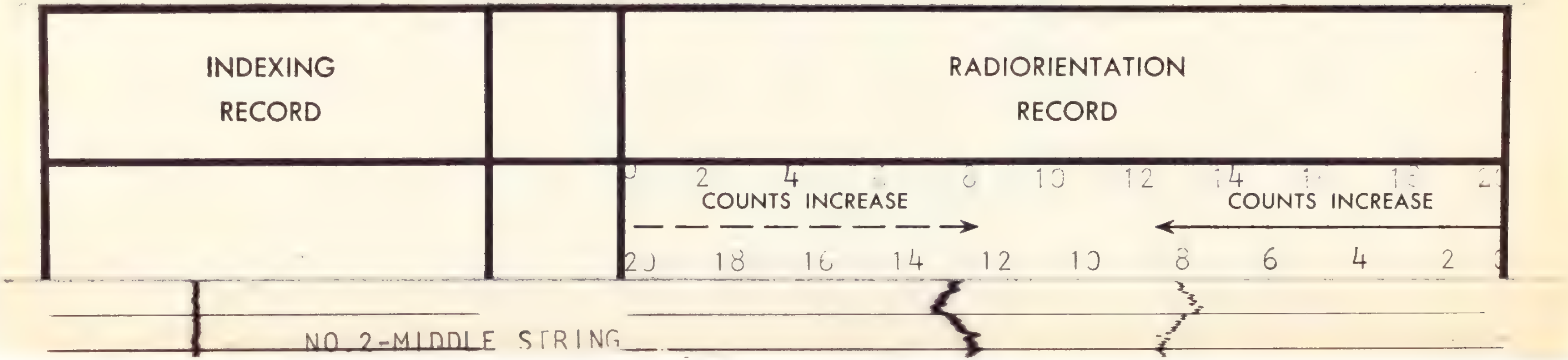
NO.2-MIDDLE STRING PERFORATED 1094-1102 ONE SHOT PER FOOT WITH 1 [illegible] HYPERDOME

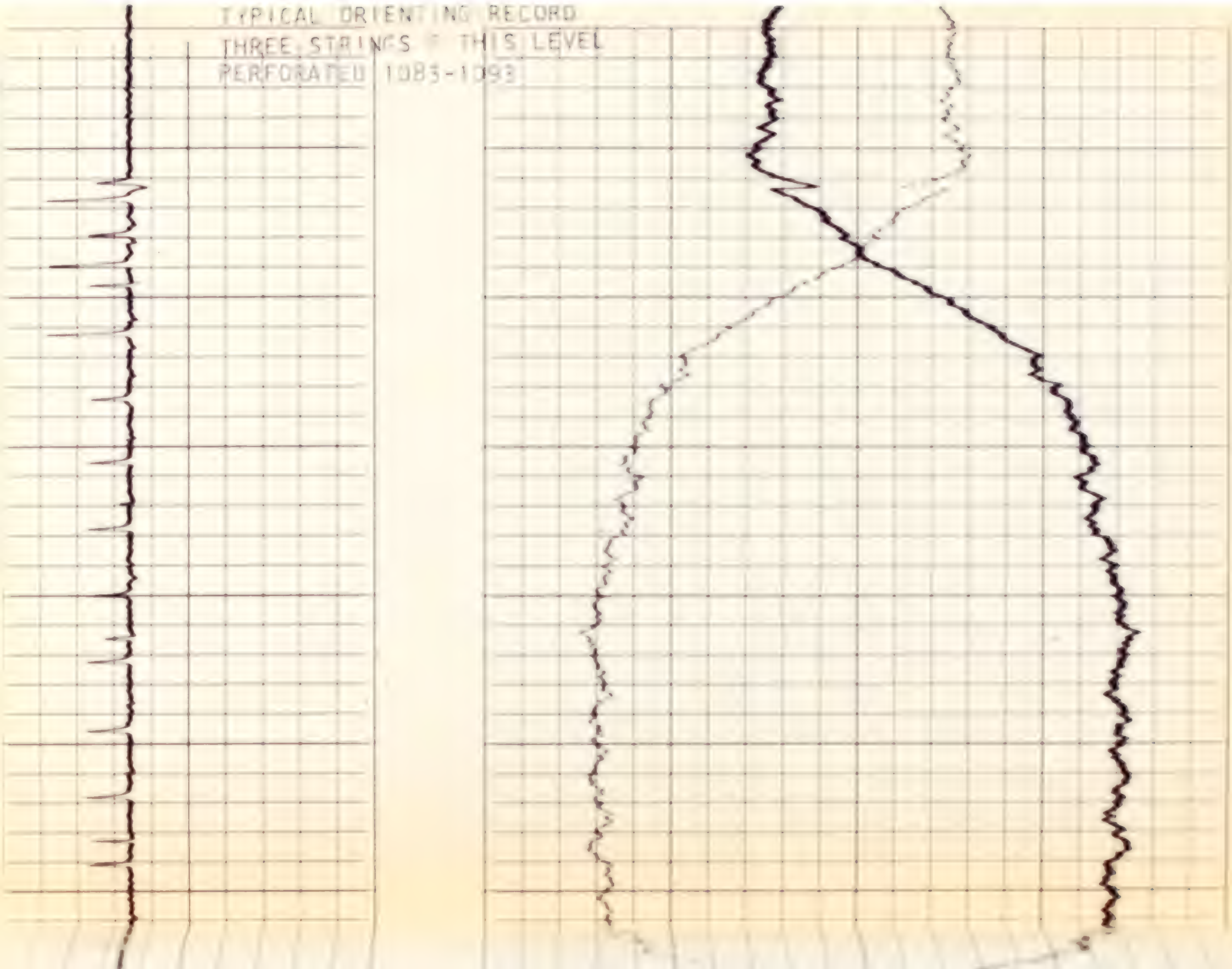


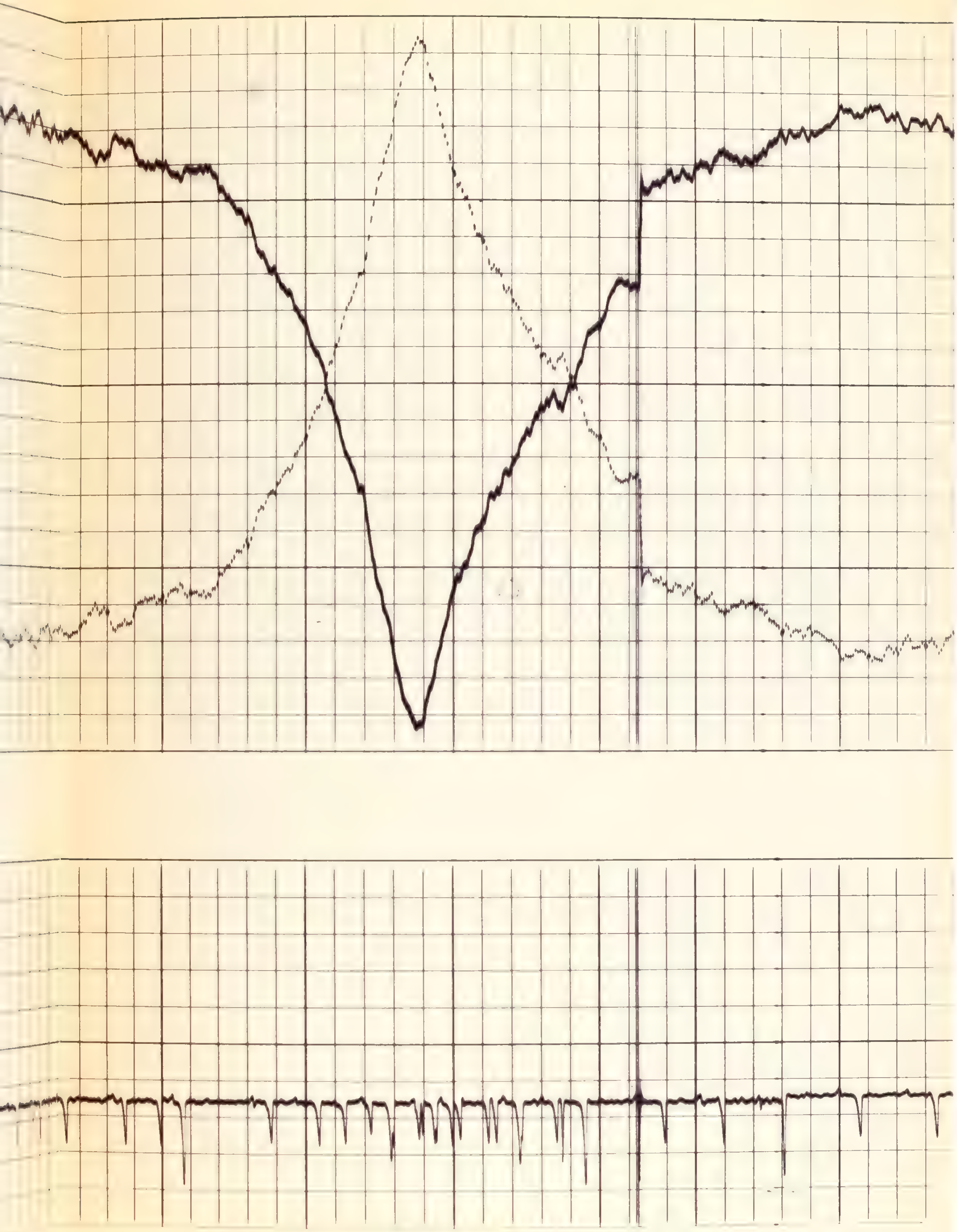


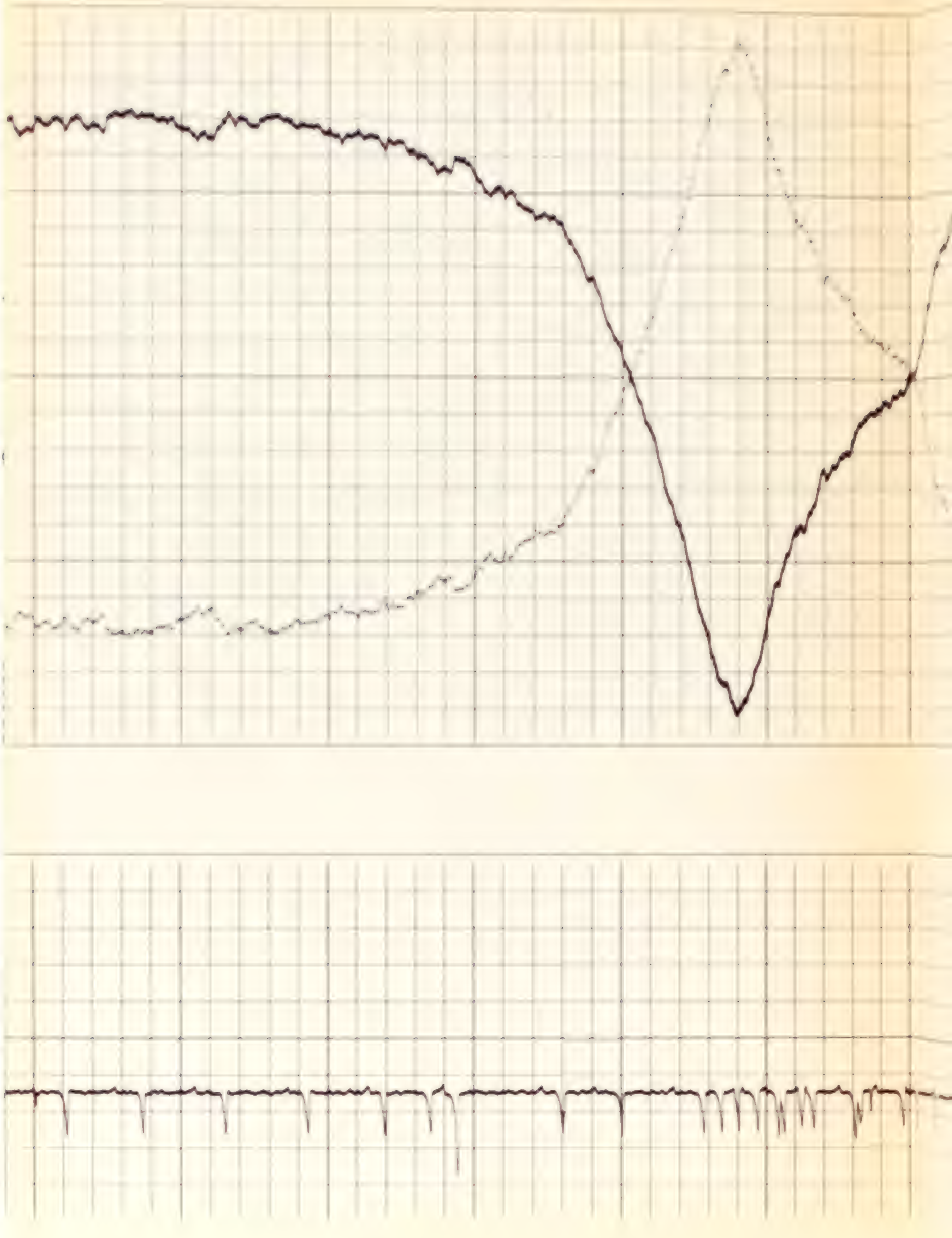
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

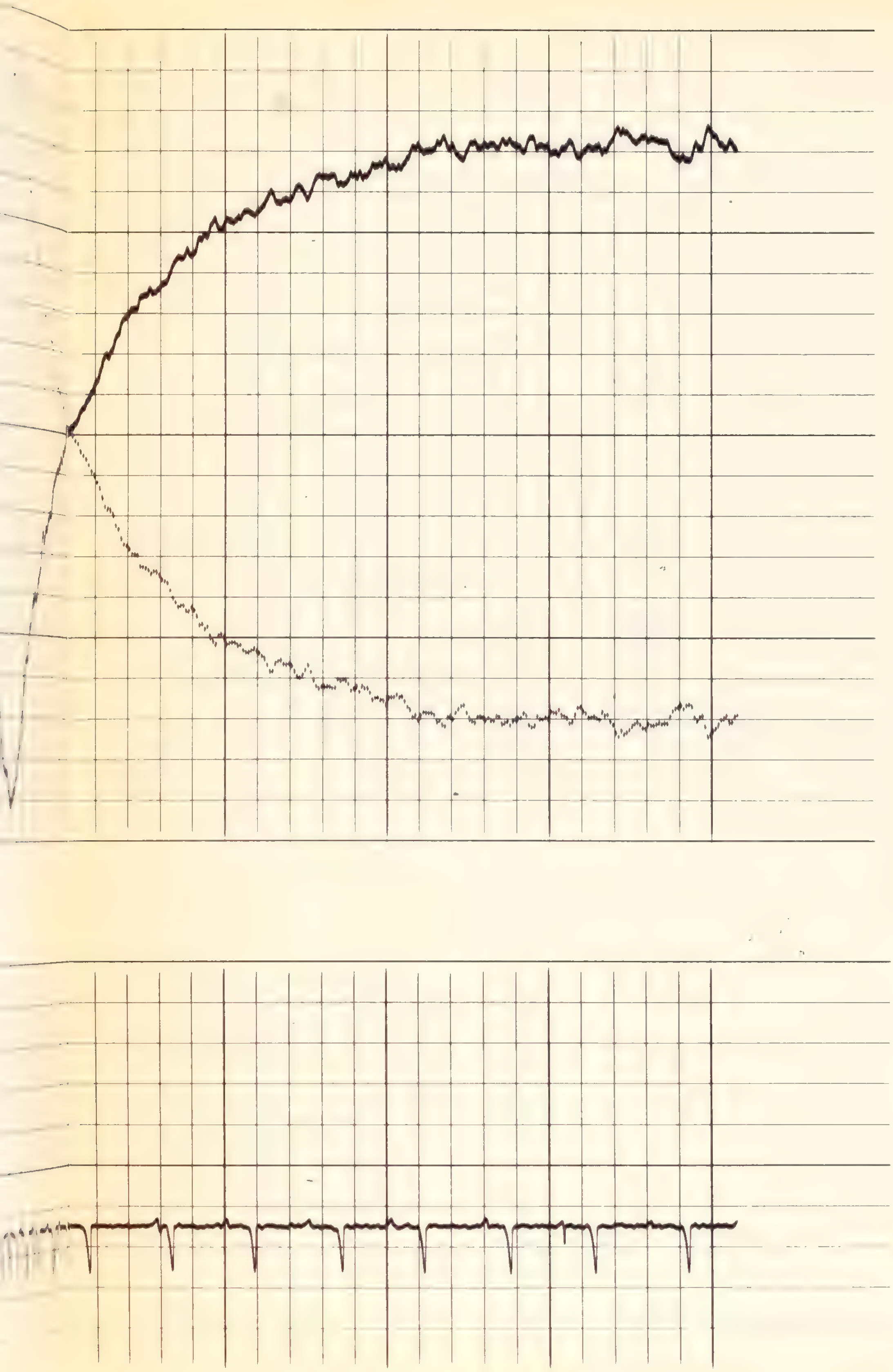
Schlumberger




TYPICAL ORIENTING RECORD
THREE STRINGS @ THIS LEVEL
PERFORATED 1083-1093



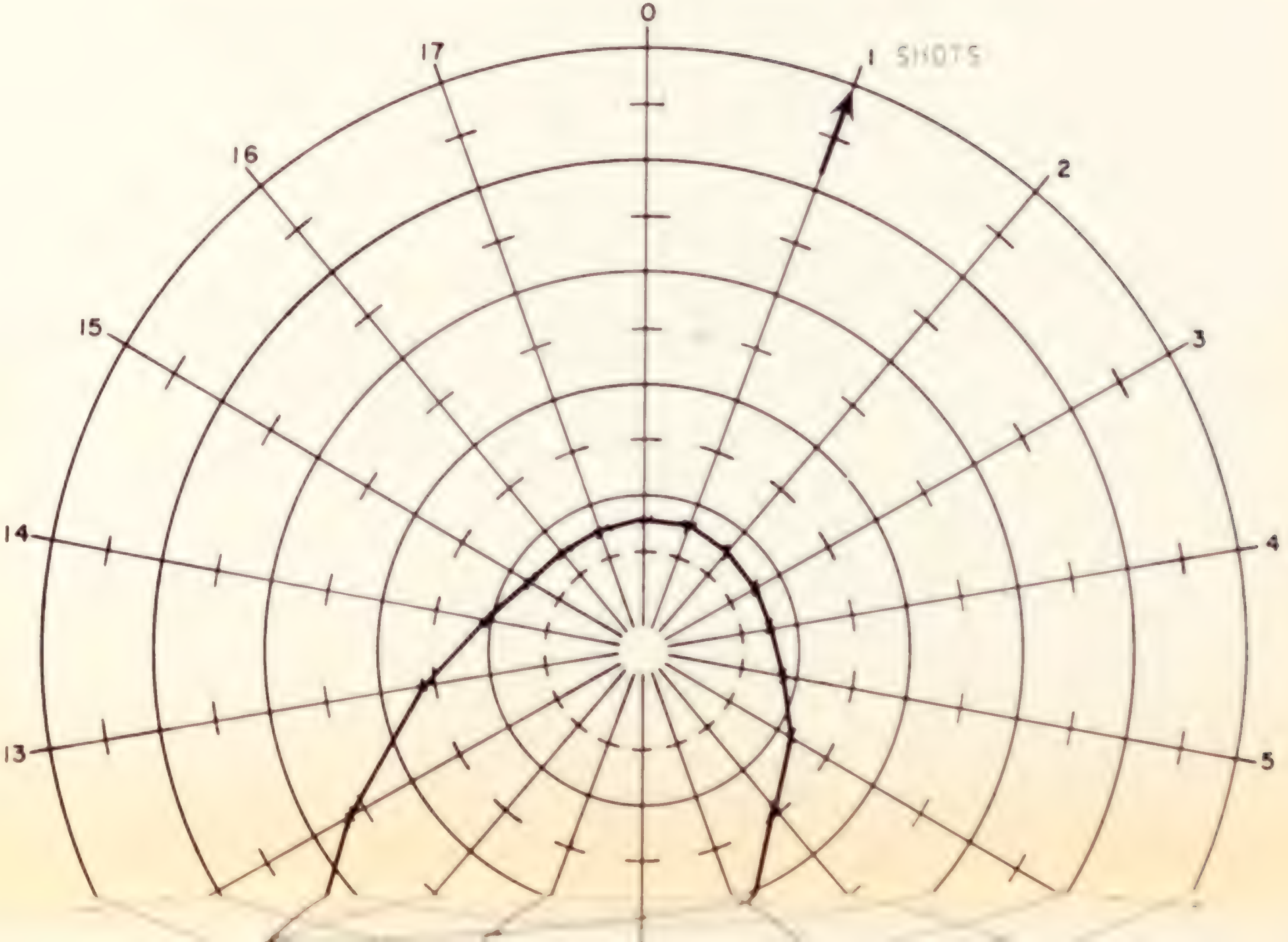


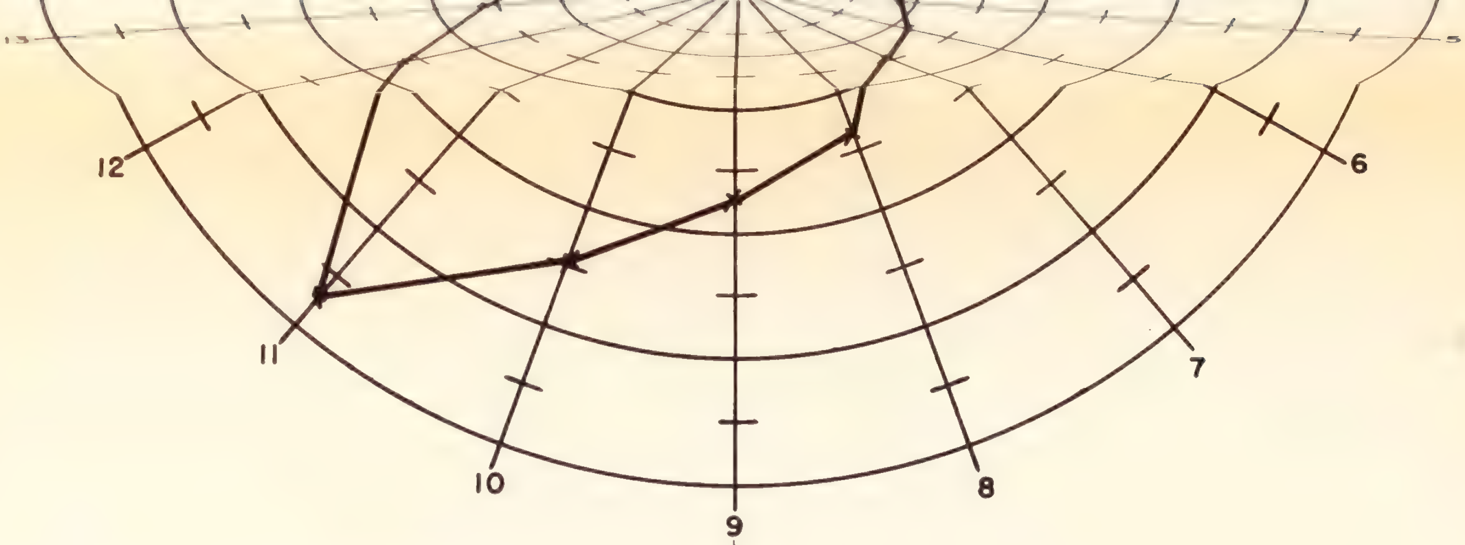


RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1083-1093 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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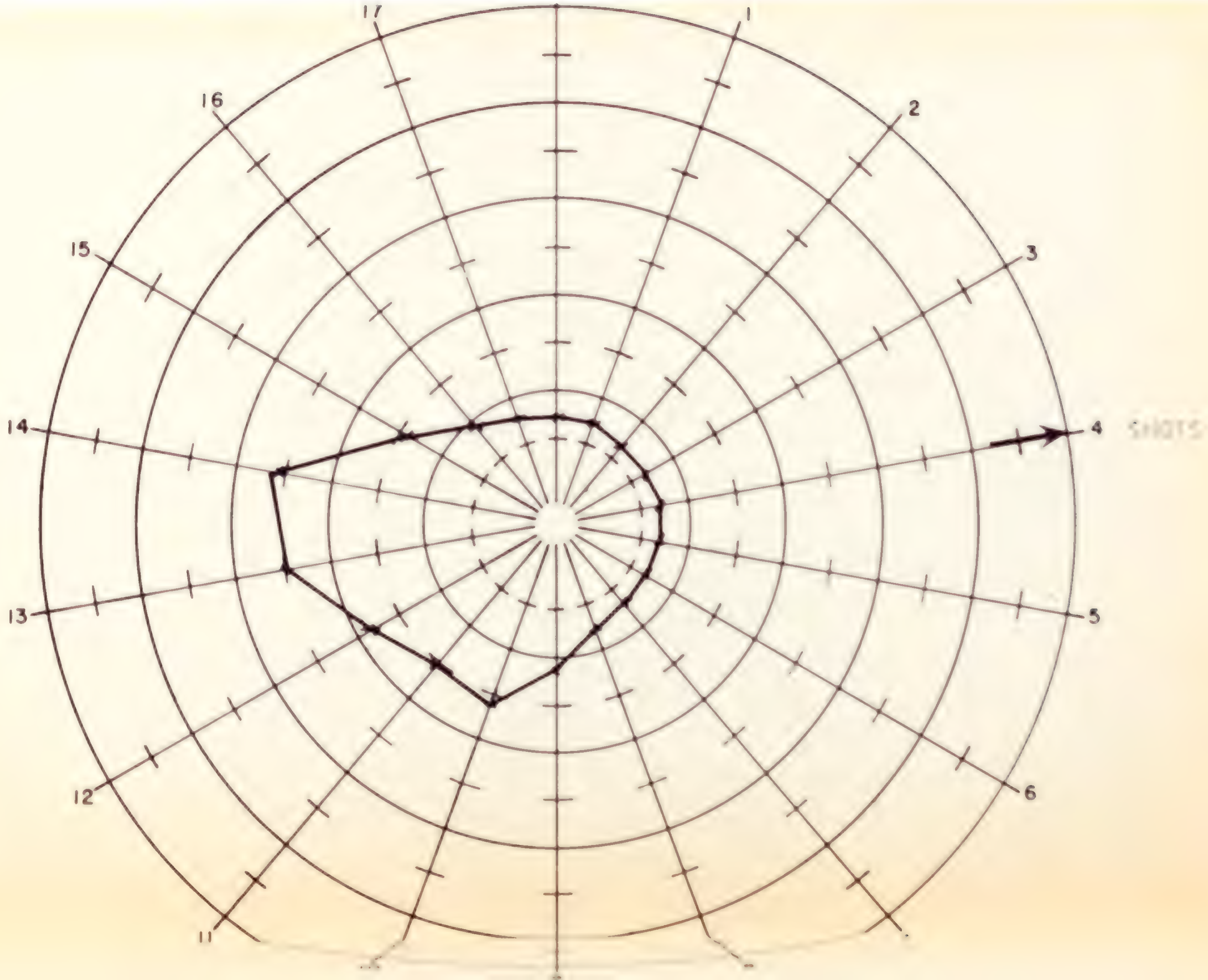
RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1172-1182 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


17
1
16
2
15
3
14
4
SHOTS
13
5
12
6
11

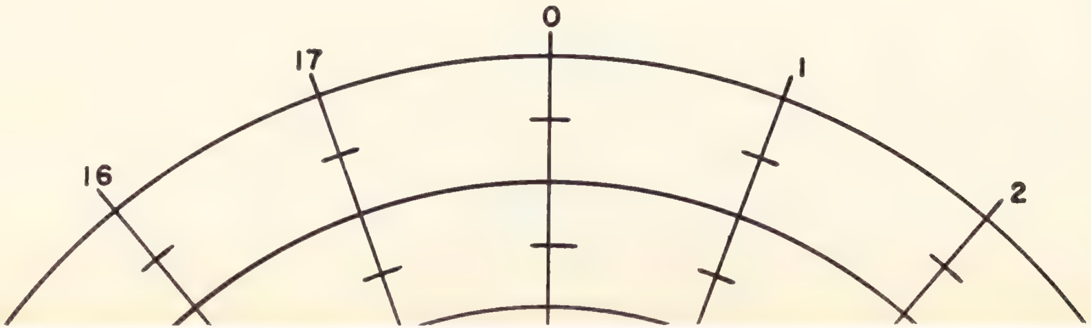
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

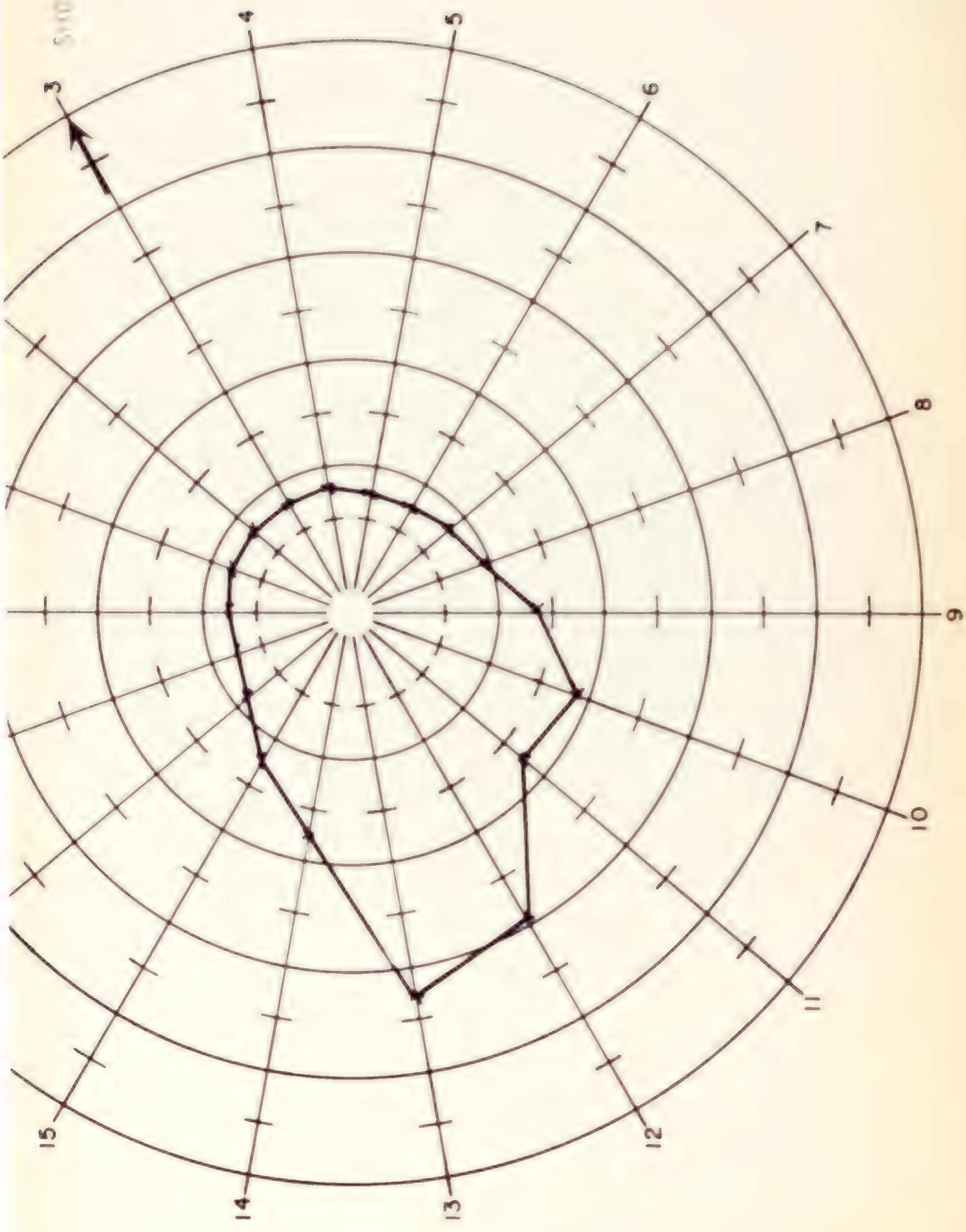
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1161-1171 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




3
4
5
6
7
8
9
10
11
12
13
14
15

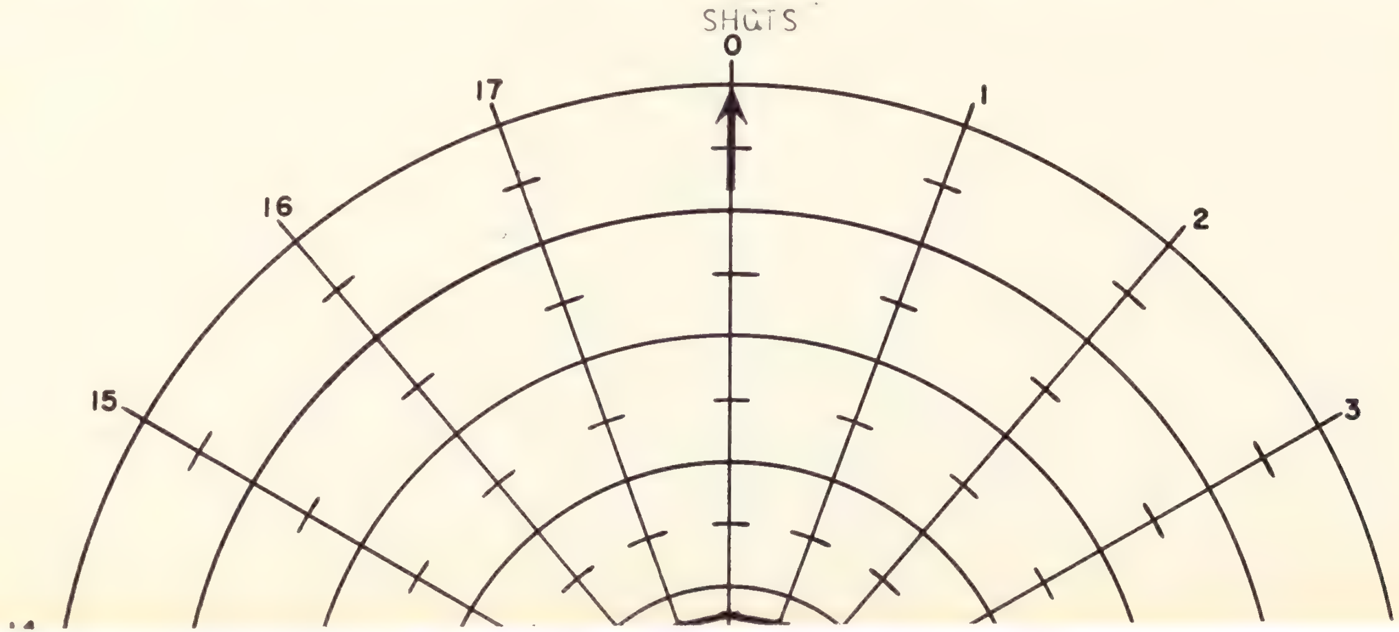
This chart, computation and/or interpretation of our readings from our gamma gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

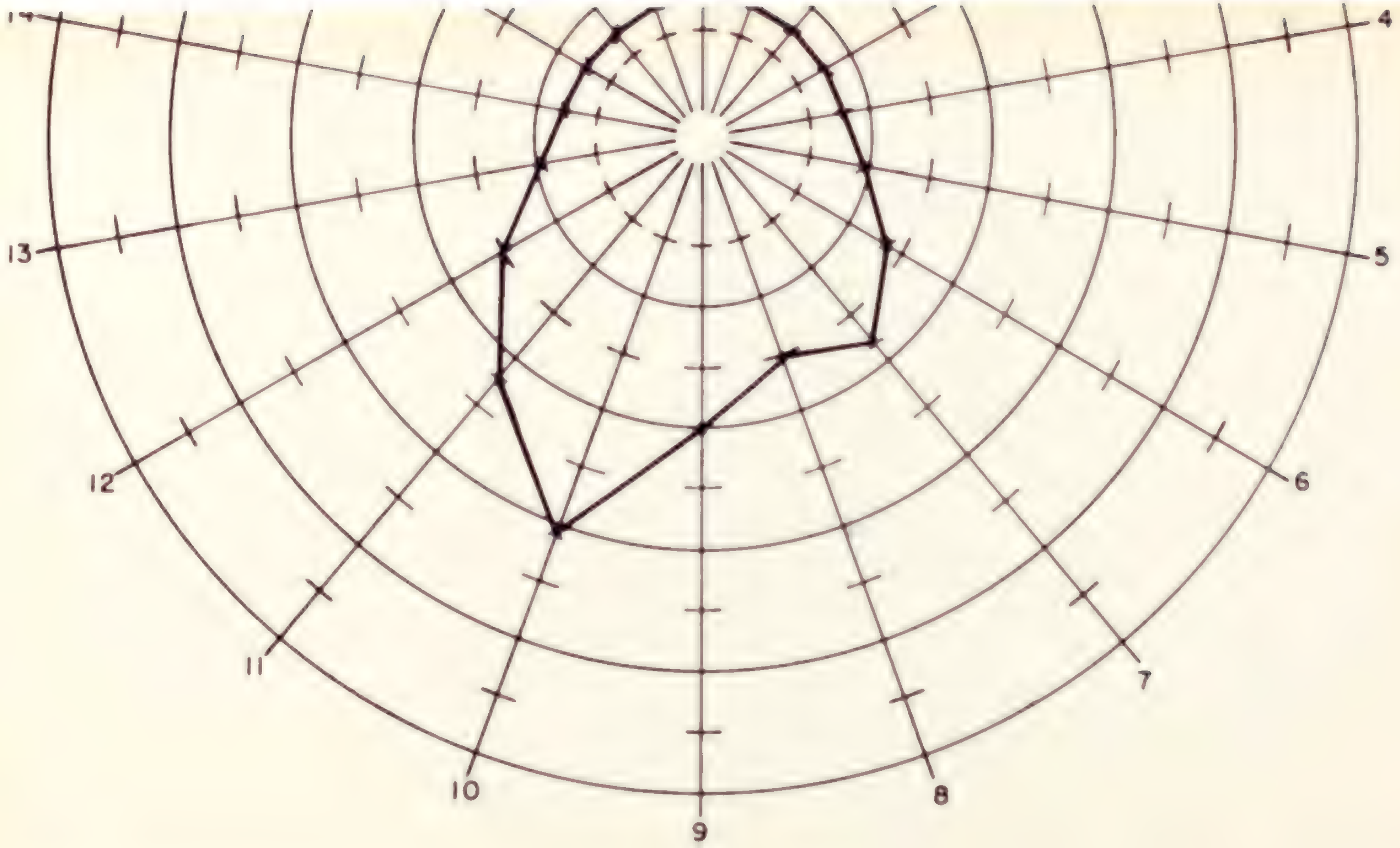
Schlumberger

RADIORIENTATION PLOT

POT-B

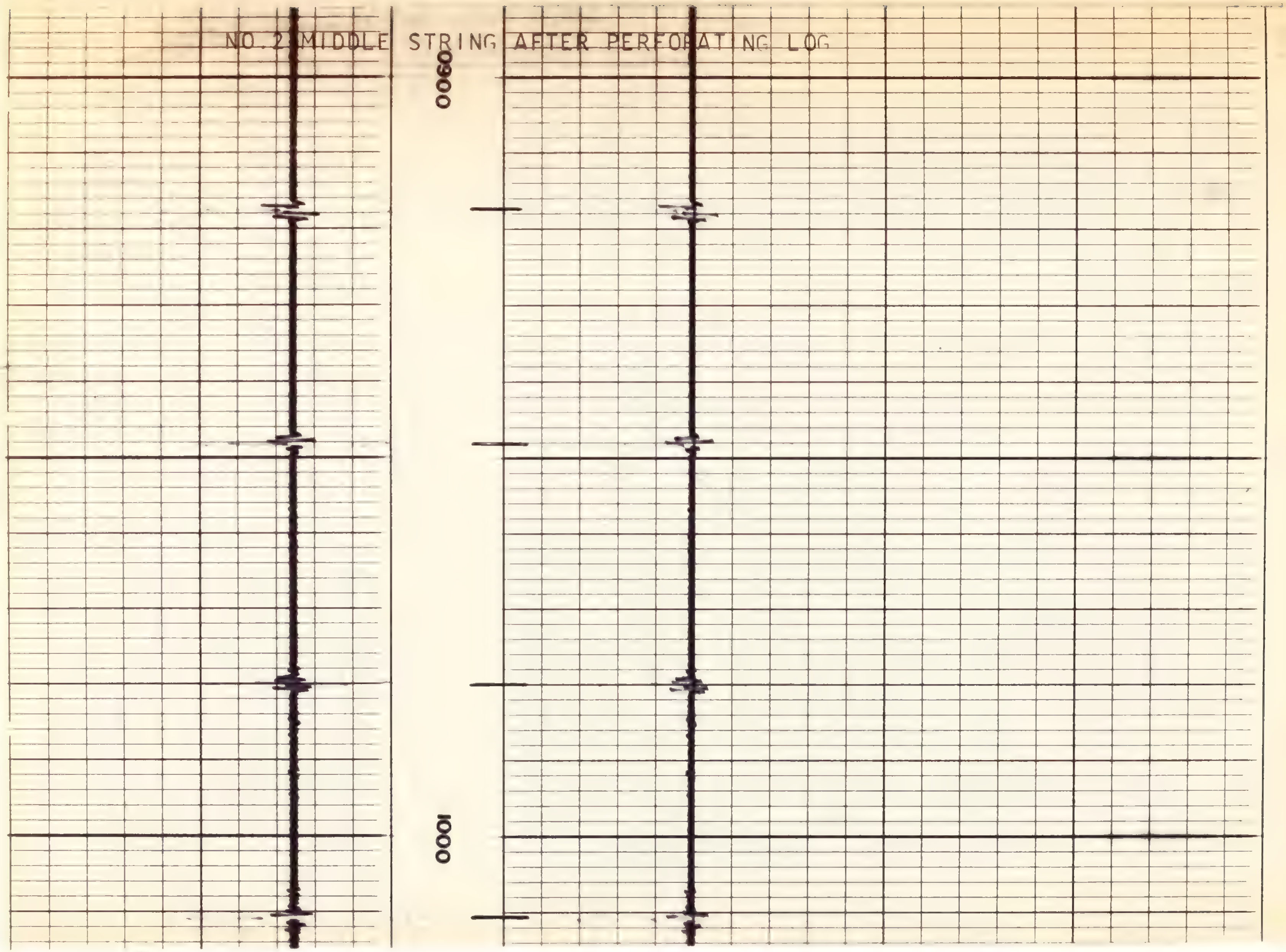
NO.2 MIDDLE STRING PERFORATED 1050-1060 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

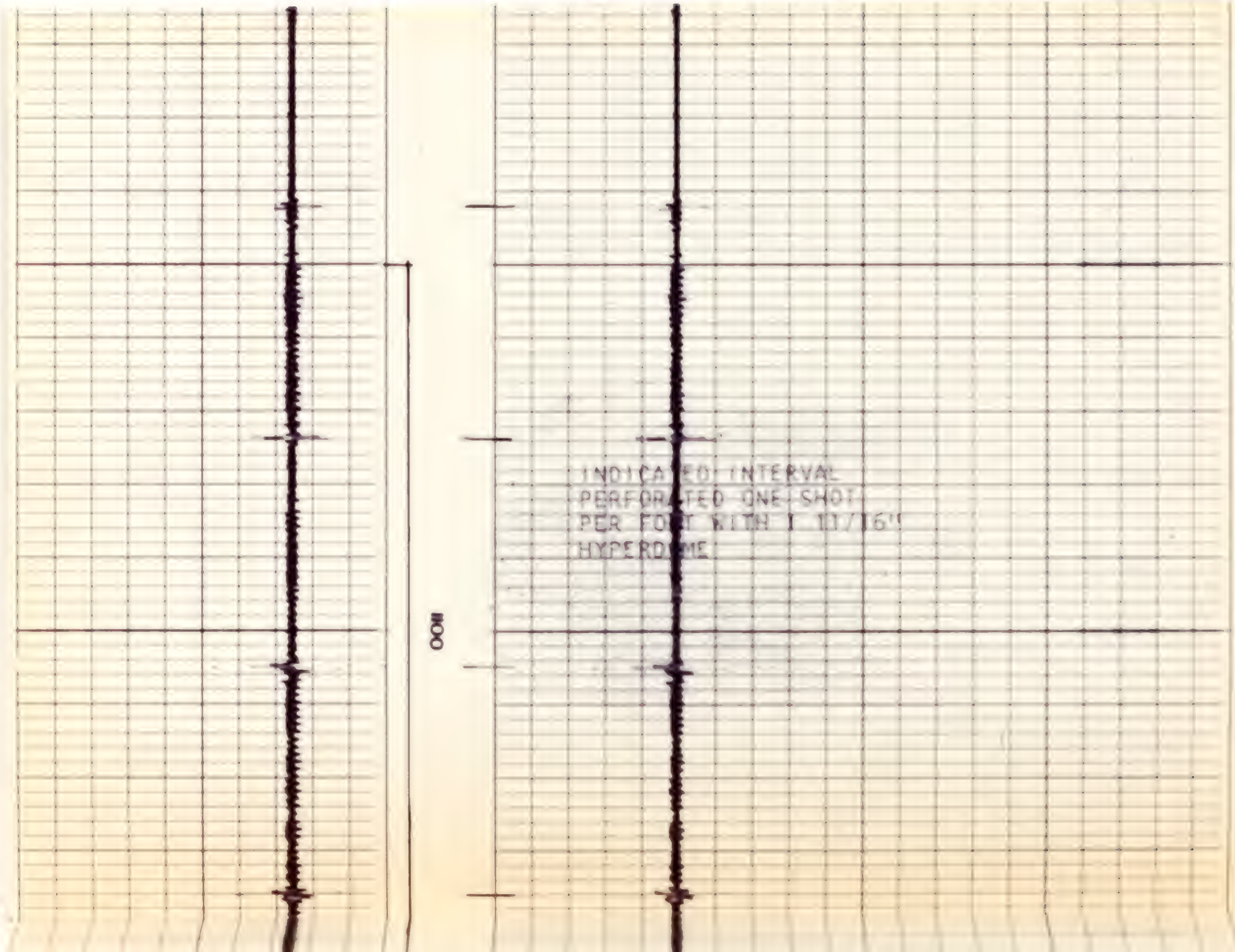




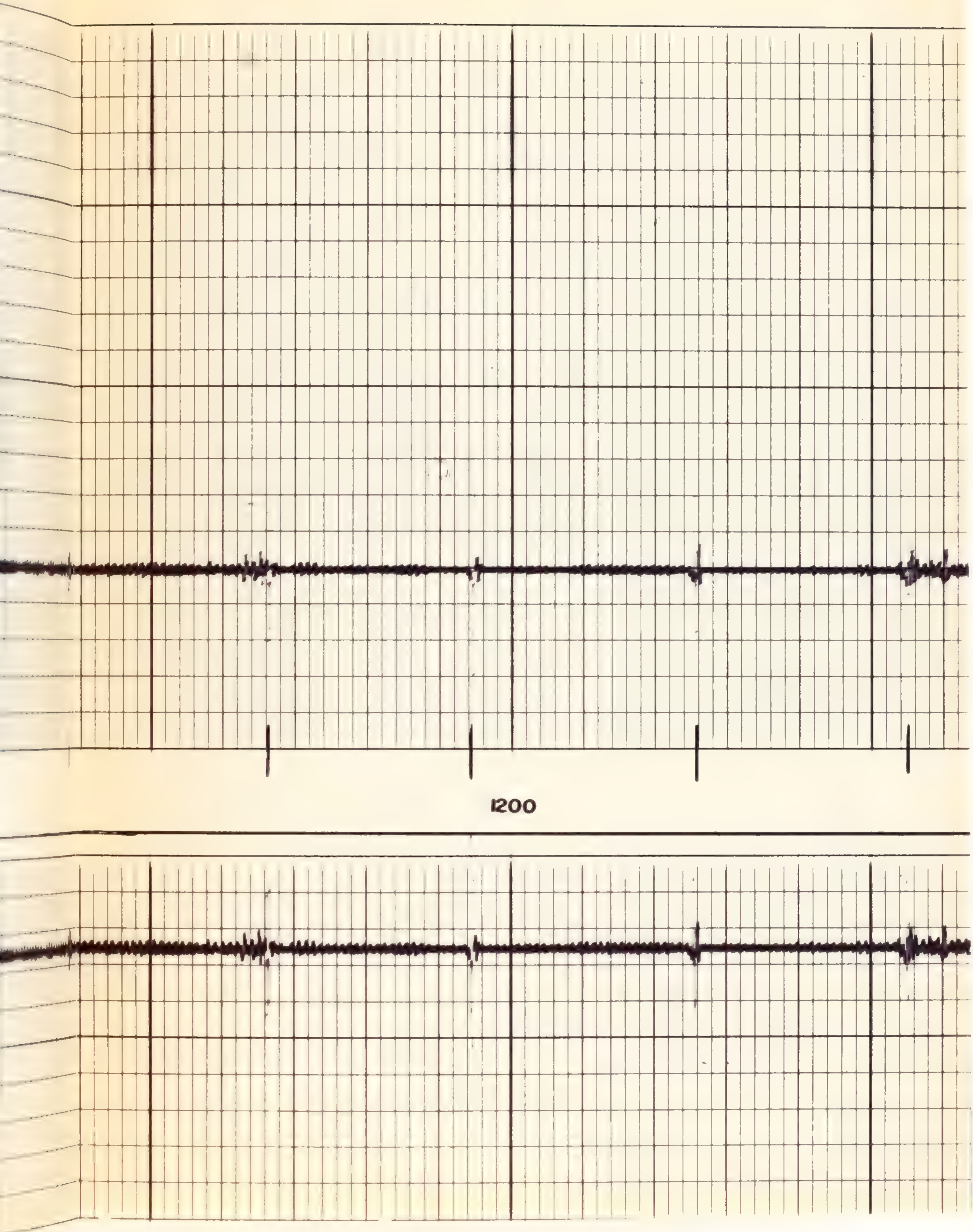
This chart, computation and or interpretation of our readings from our gamma-gamma orientation and [illegible] testing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are to be set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

Schlumberger


NO.2 MIDDLE STRING AFTER PERFORATING LOG
0900
1000



INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME


1200

Schlumberger

CEMENT BOND LOG

GR-VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION SORGHUM GULCH
WELL AT-1D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD, ET AL

WELL AT-1D

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.

1515' FWL & 1511' FSL

Sec. 7 Twp. 3S Rge. 96W

Other Services:
ORP-HD

Permanent Datum: GL, Elev. 6903
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6903

Date	9-12-74	Type Drill Fluid	AIR MIST
Run No.	ONE	Fluid Level	FULL
Depth — Driller	1640-1441	Max. Rec. Temp.	- °F
Depth — Logger	1630-1438	Est. Cement Top	795
Btm. Log Interval	1622-1430	Equip. | Location	3552 | VERNAL
Top Log Interval	695-695	Recorded By	MARTIN-ST. AU
Open Hole Size	7-7/8"	Witnessed By	MR. ROSS

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8				SURF	60
Prot. String #1	2 3/8	4.7		T-C	SURF	1640
Prod. String #2	2 3/8	4.7		T-C	SURF	1441
STRING #3	2 3/8	4.7		T-C	SURF	1079

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			150 SKS	
Type of cement			HOWCO LT. WT.	
Additive			10#/SK-GILSONITE	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE

The well name, location and borehole reference data were furnished by the customer

PRIMARY CEMENTING PROCEDURE

	Hour — date		Hours from start of operation
Started pumping cement	[illegible]	[illegible]	
Release pressure	1[illegible]	[illegible]	
Start Cement Bond Log	1[illegible]	[illegible]	
Finish Cement Bond Log			

REMARKS
Service Order No. [illegible]
Csg. Collars Recorded [illegible] ft.

Preceding fluid ______ Volume ______ bbls.
Cement pumped ______ bbls./minute
Pipe reciprocated during Pumping: Yes ______ No ______
Pipe reciprocated after plug down: Yes ______ min. No ______

SQUEEZE JOB DETAIL

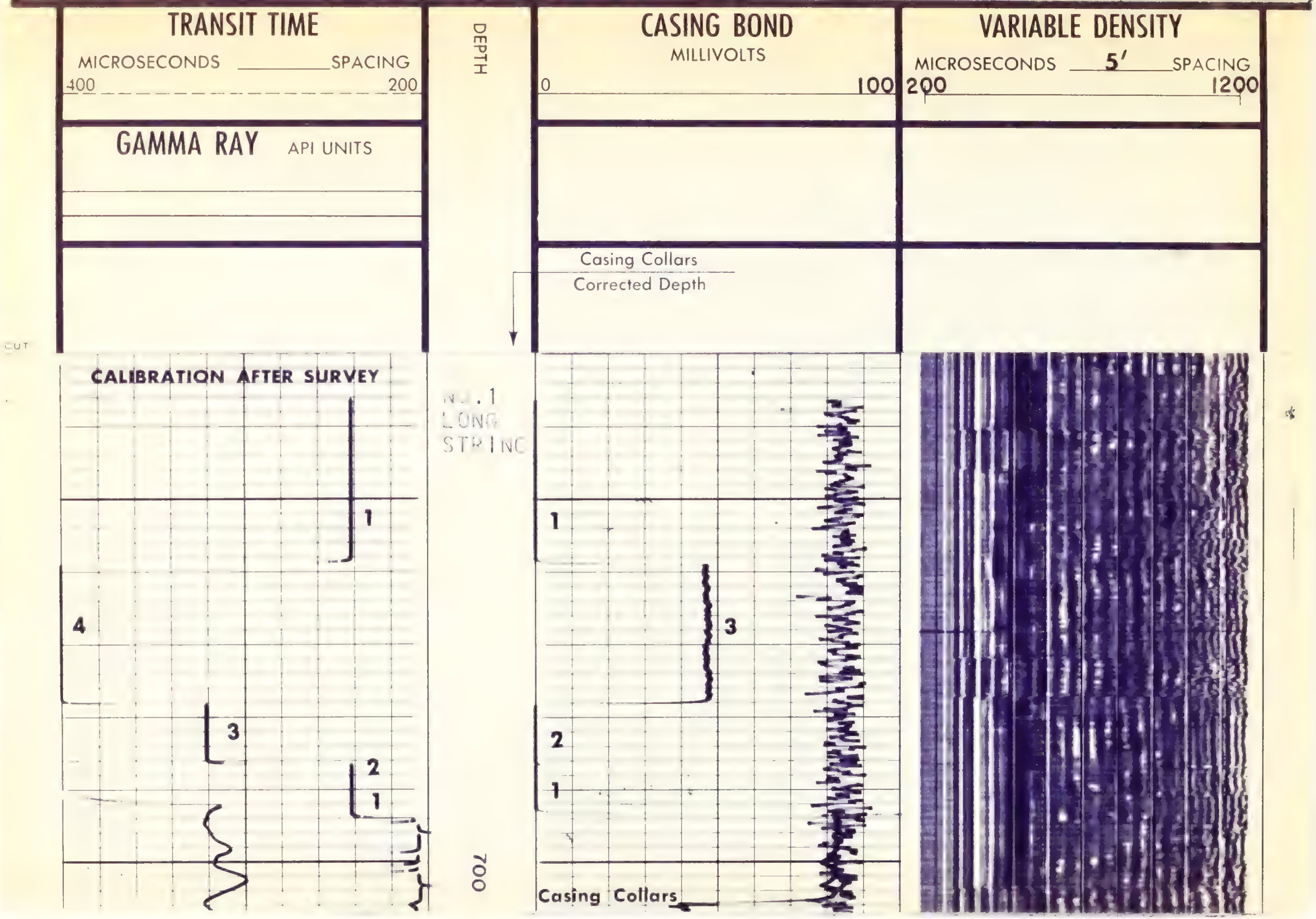
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

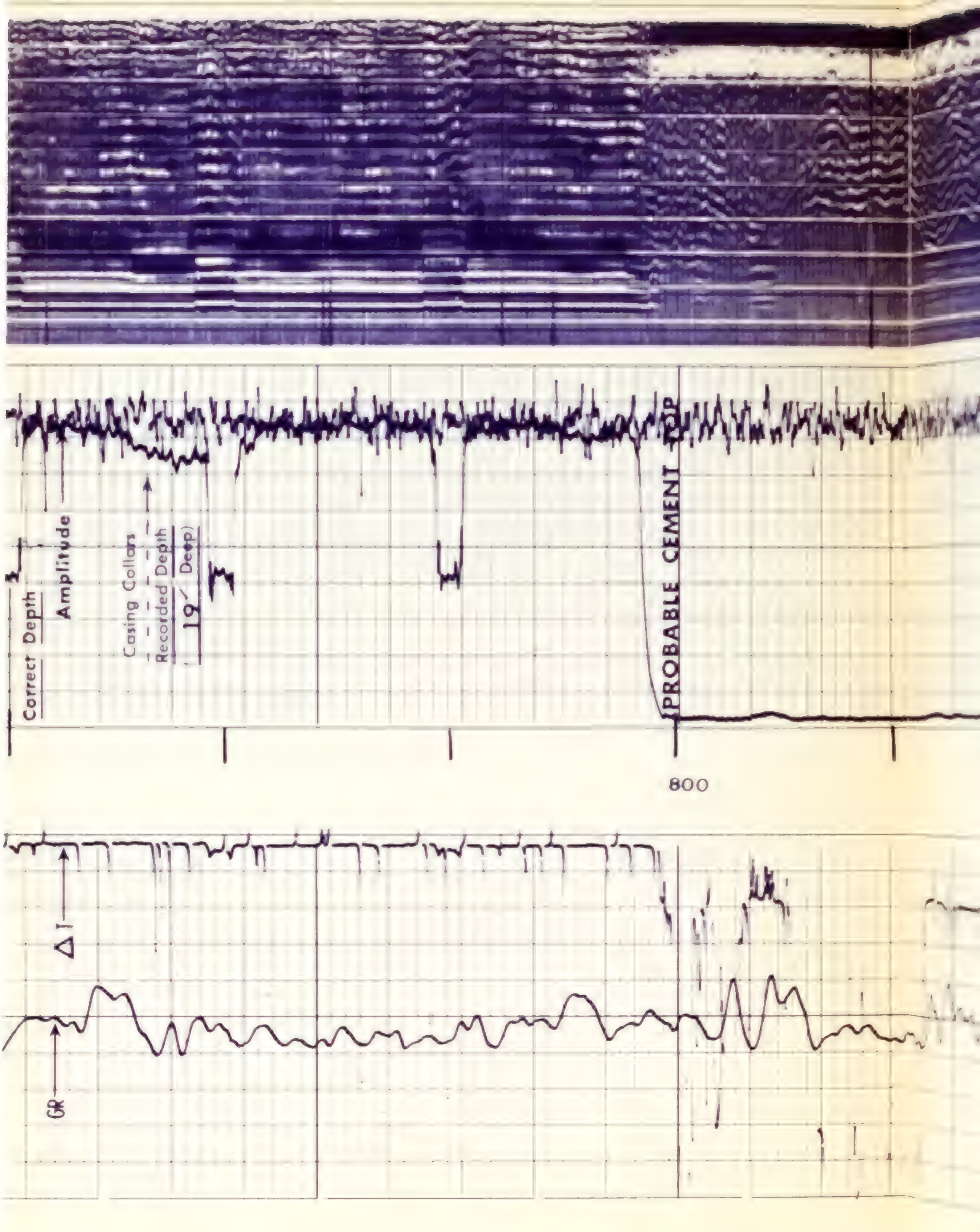
EQUIPMENT DATA

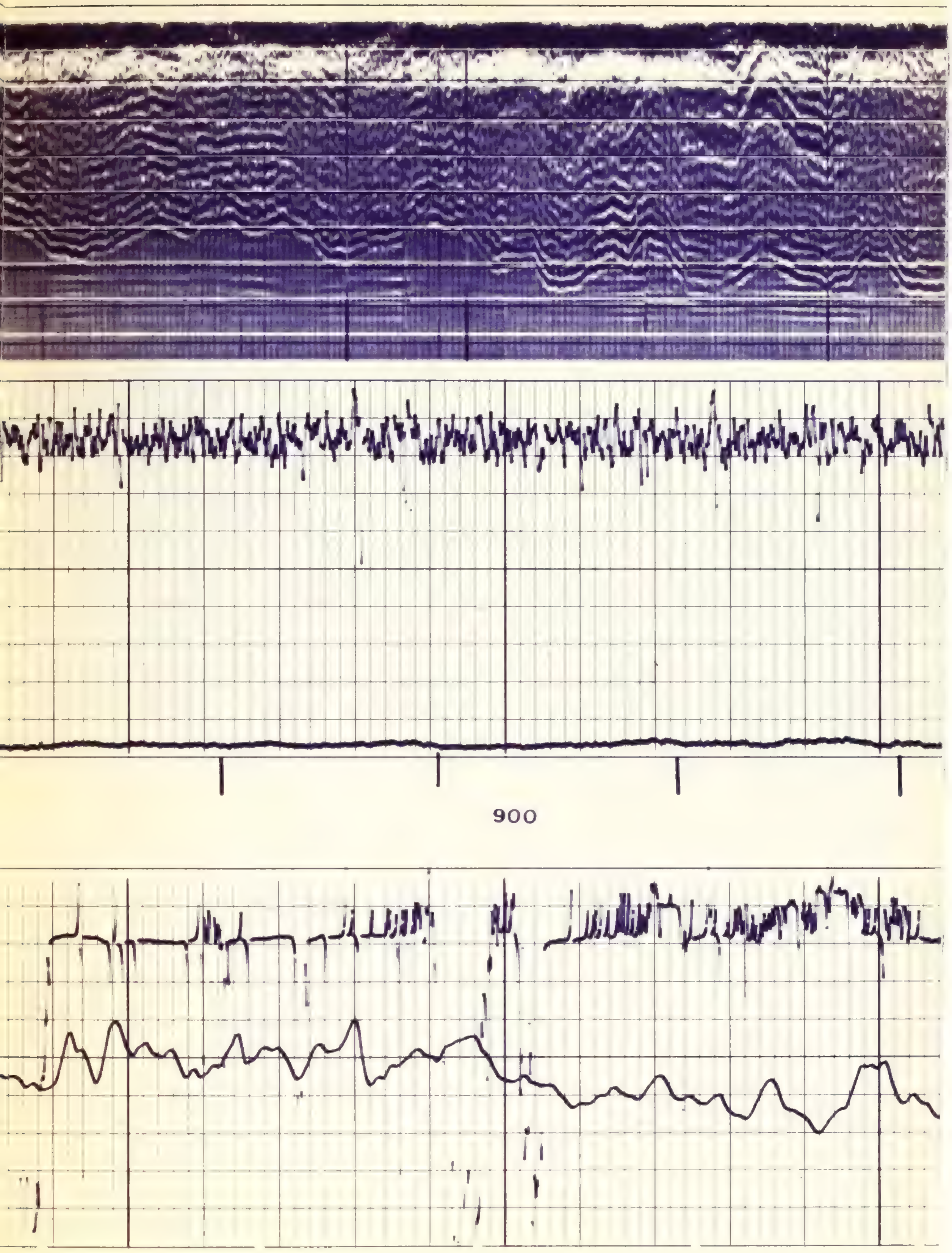
	Centralizer Depths	Scratcher Depths
Sonic Panel No.	[illegible]	
Sonic Cart No.	[illegible]	
Sonic Sonde No.	[illegible]	
CRP No.	14	
Mem Panel No.	[illegible]	
GR Panel No.	[illegible]	
GR Cart No.	[illegible]	
Centralizer Type	[illegible]	
No.	[illegible]	
To Level (MV)	[illegible]	
Cart. Gain	[illegible]	
CRP Intensity	.15	
R9G Intensity	[illegible]	
Logging Speed	10 FPM	
Time Constant		

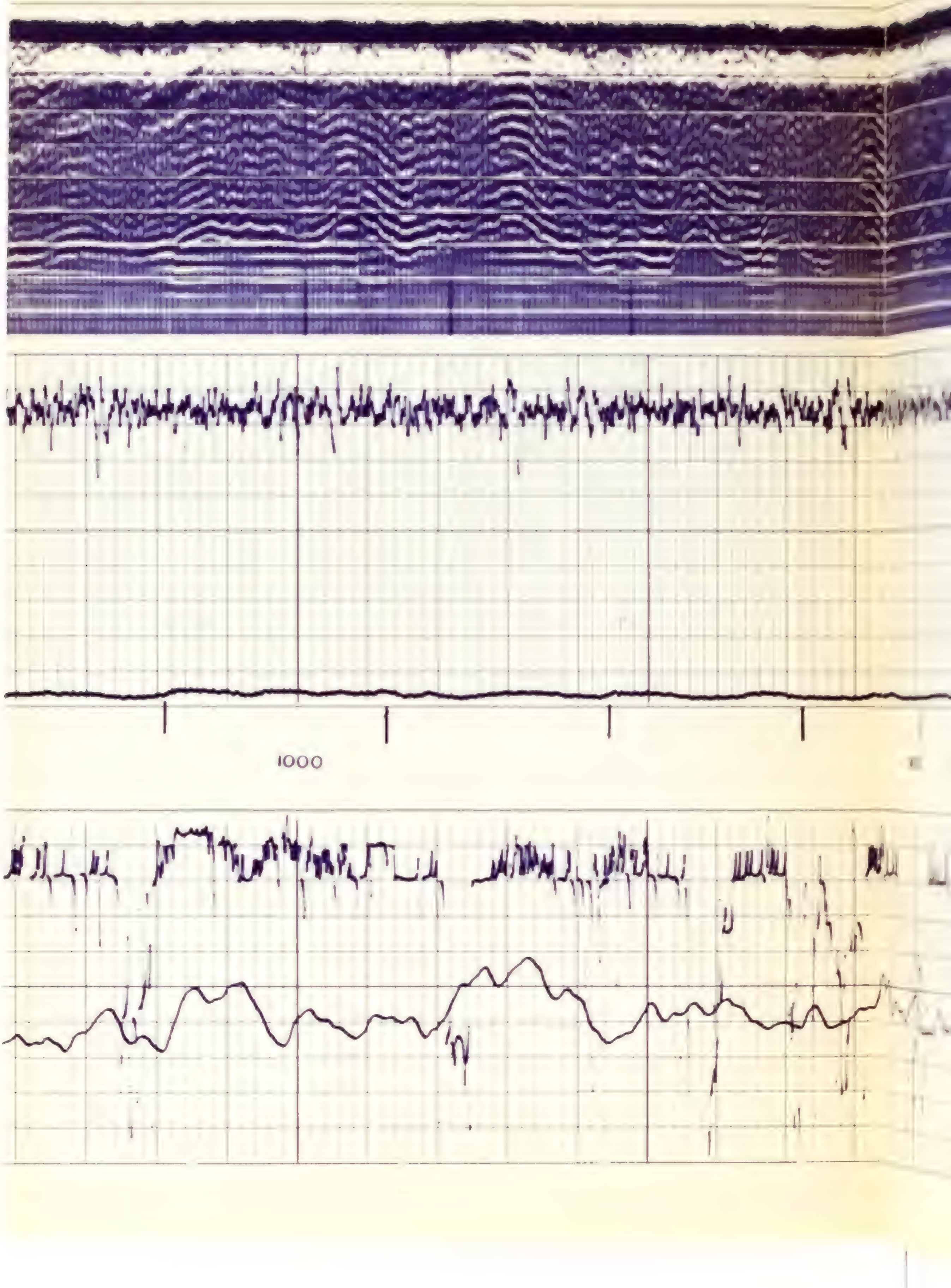
AVERAGE WELL DRIFT:
from ______ to ______ ; from ______ to ______ ; from ______ to ______

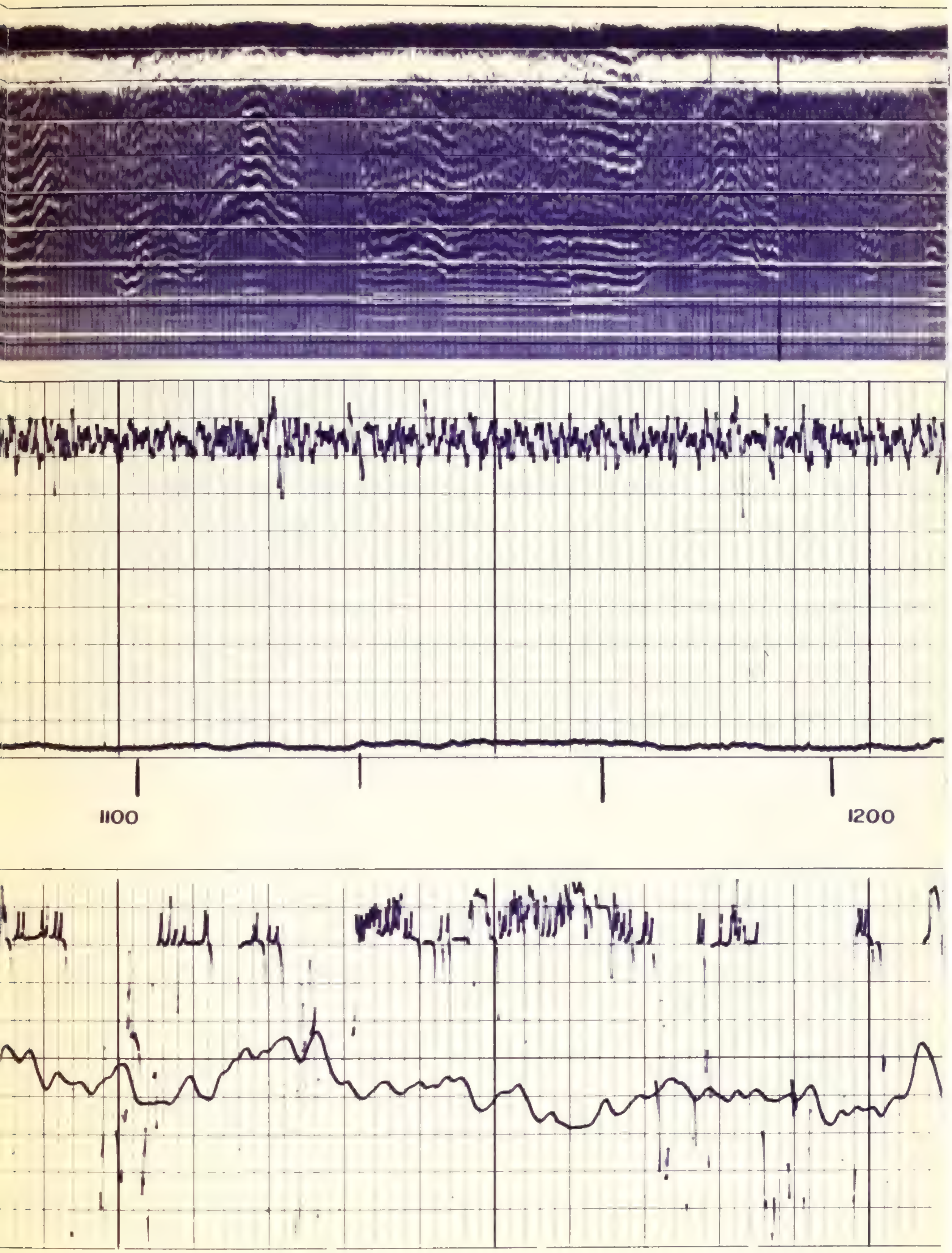
TRANSIT TIME
GAMMA RAY
CASING BOND
VARIABLE DENSITY

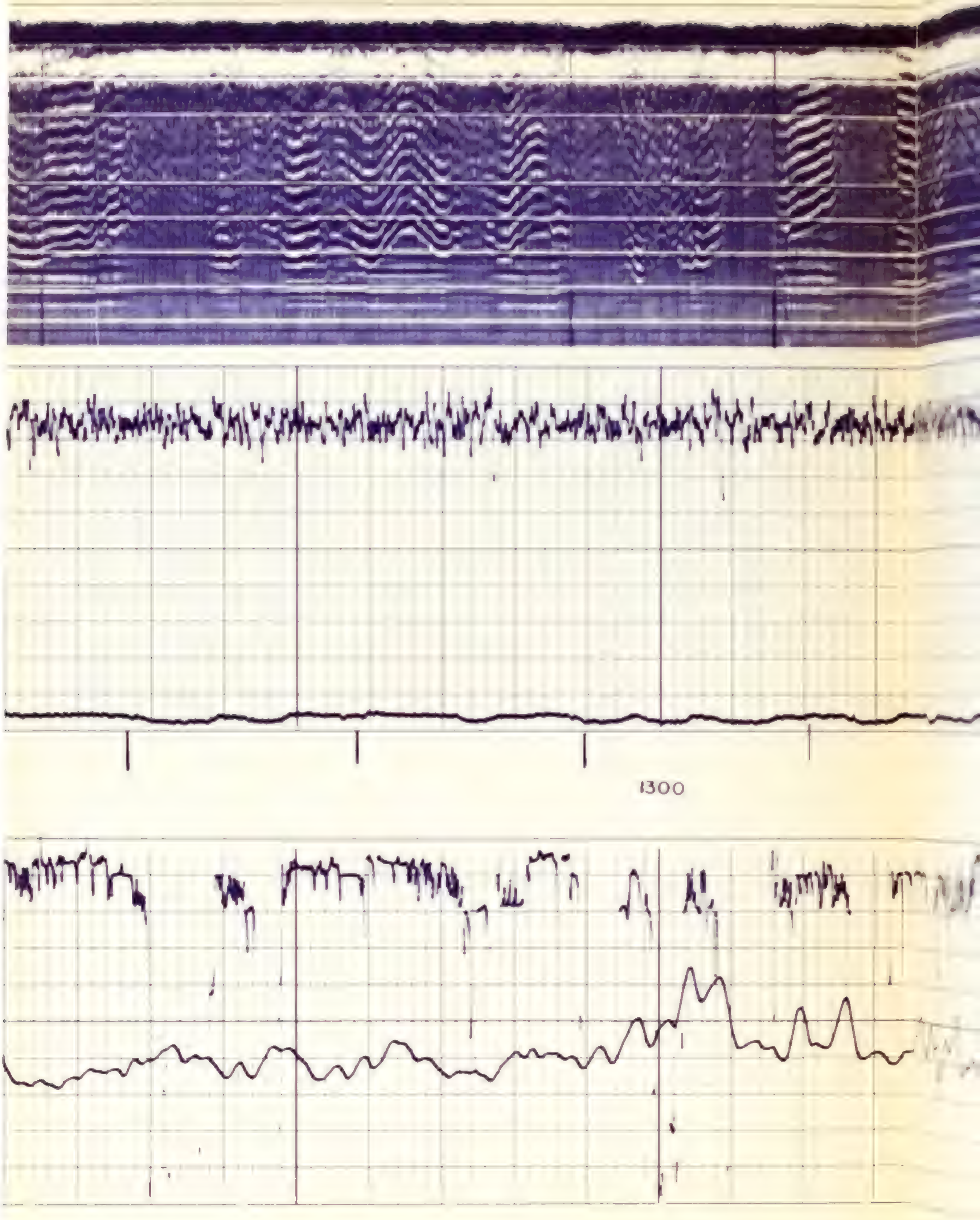

TRANSIT TIME
MICROSECONDS
SPACING
400
200
GAMMA RAY
API UNITS
DEPTH
CASING BOND
MILLIVOLTS
0
100
VARIABLE DENSITY
MICROSECONDS
5′
SPACING
200
1200
Casing Collars
Corrected Depth
CUT
CALIBRATION AFTER SURVEY
NO. 1
LONG
STRING
1
4
3
2
1
700
1
3
2
1
Casing Collars

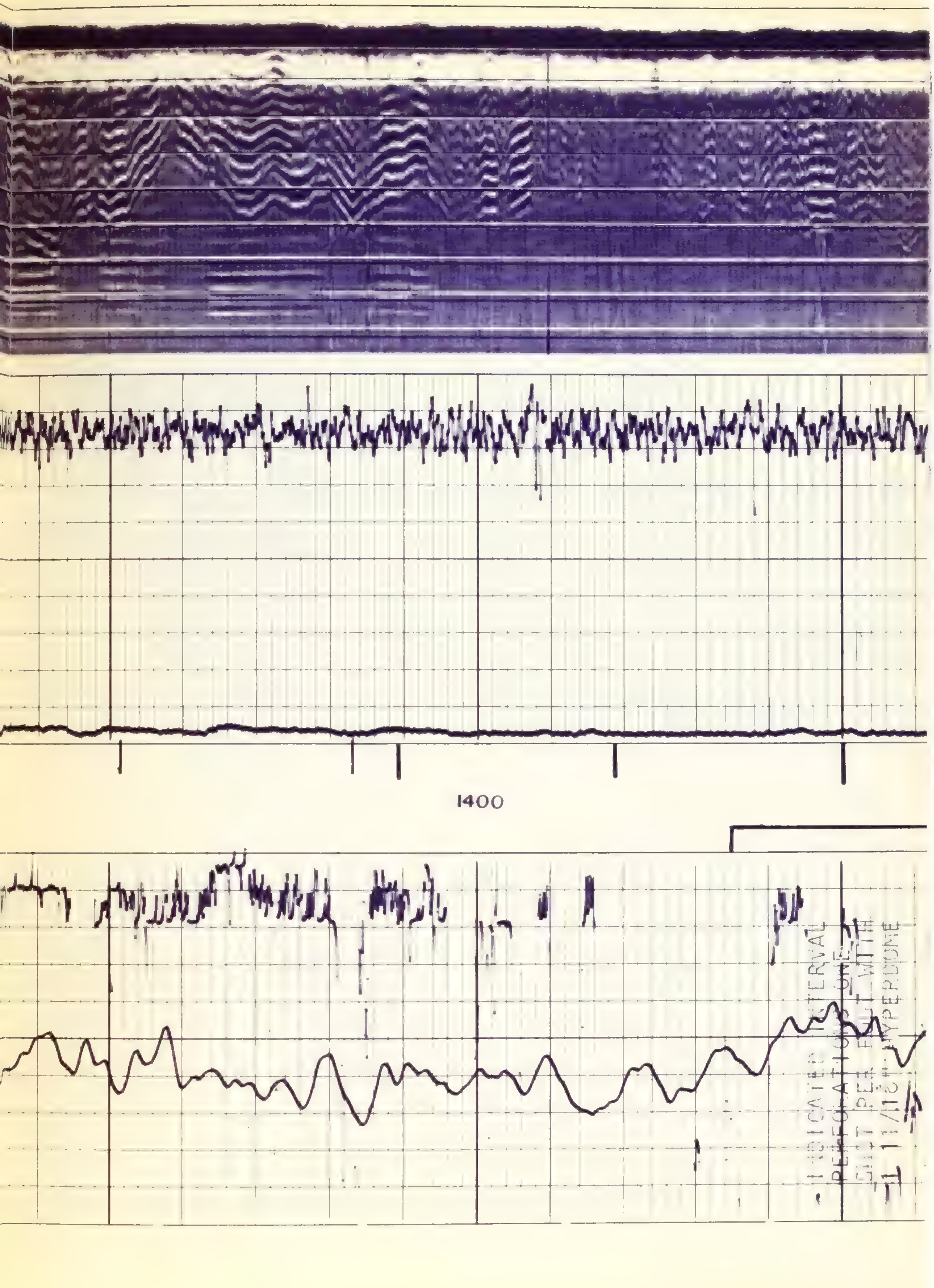

Correct Depth
Amplitude
Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
800
ΔT
GR

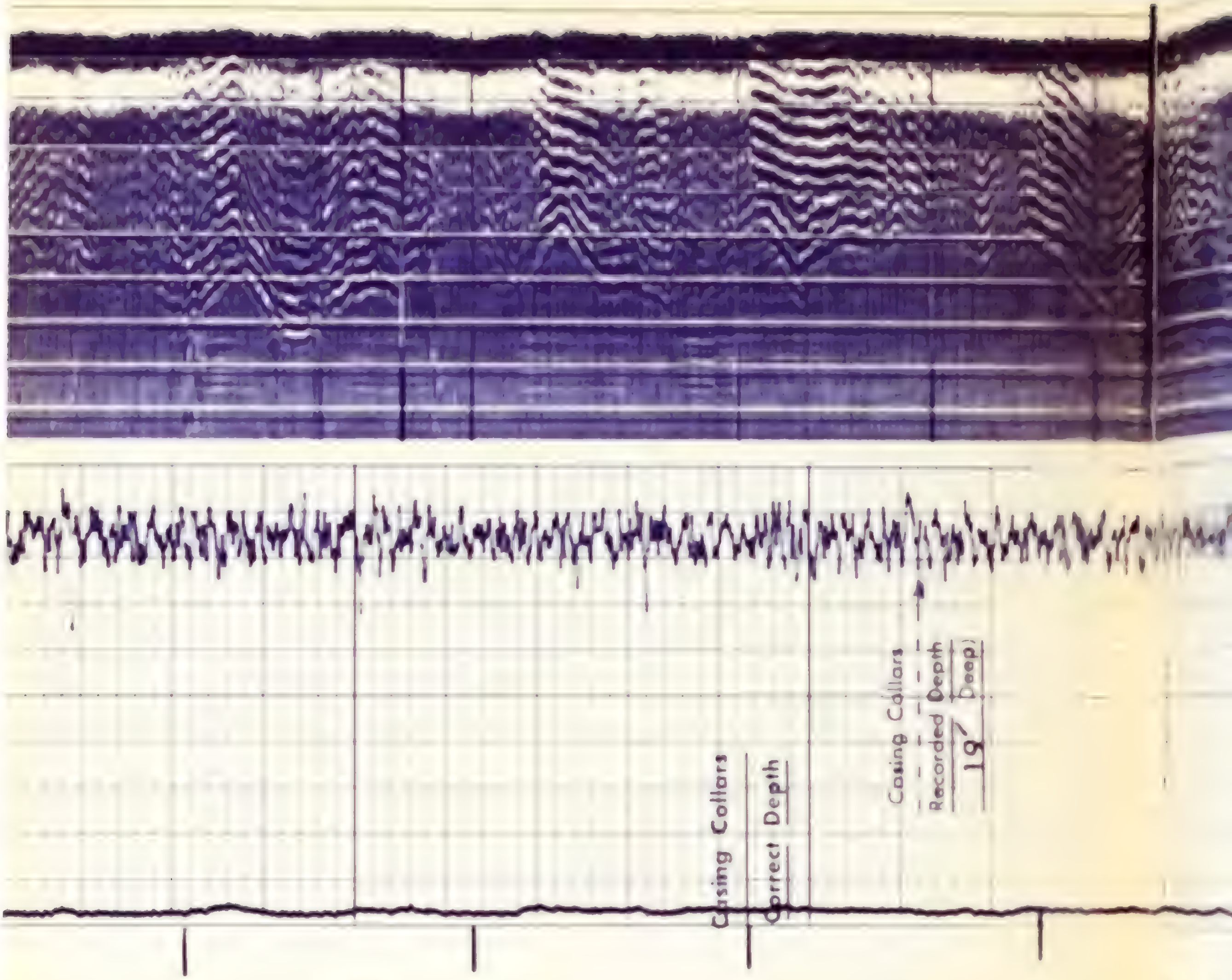

900


1000

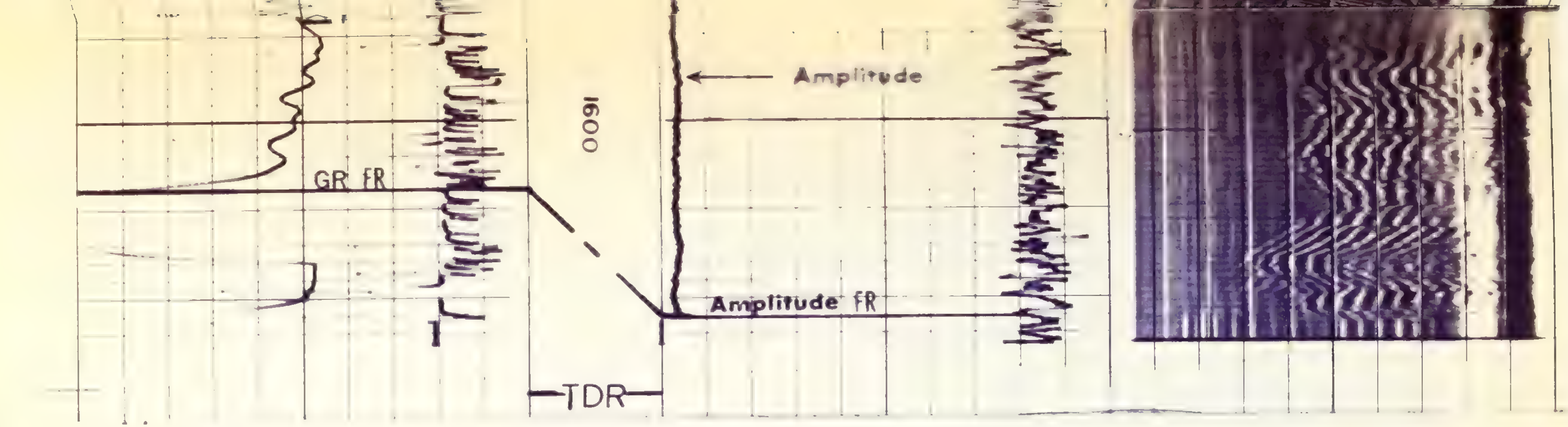

1100
1200

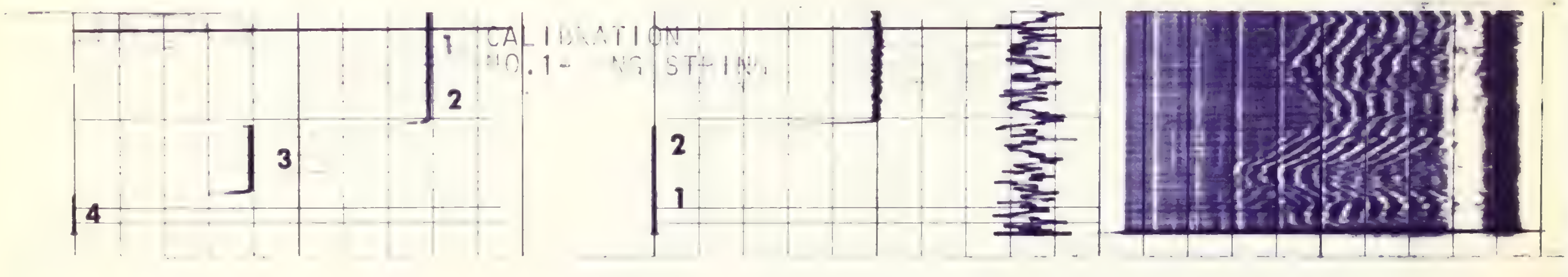

1300


1400
INDICATED INTERVAL
PERFORATIONS ONE
SHOT PER FOOT WITH
1 11/16" HYPERDOME

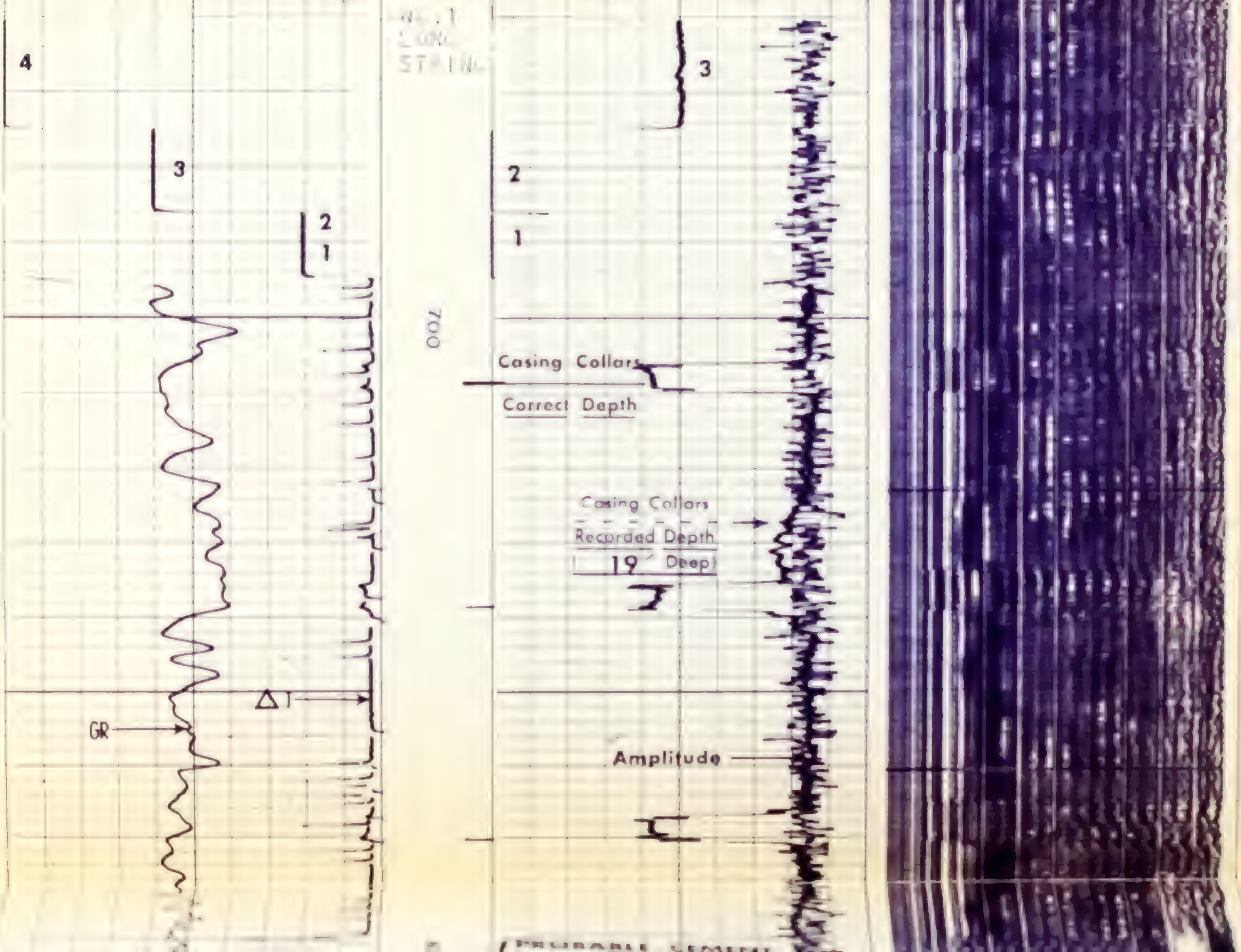


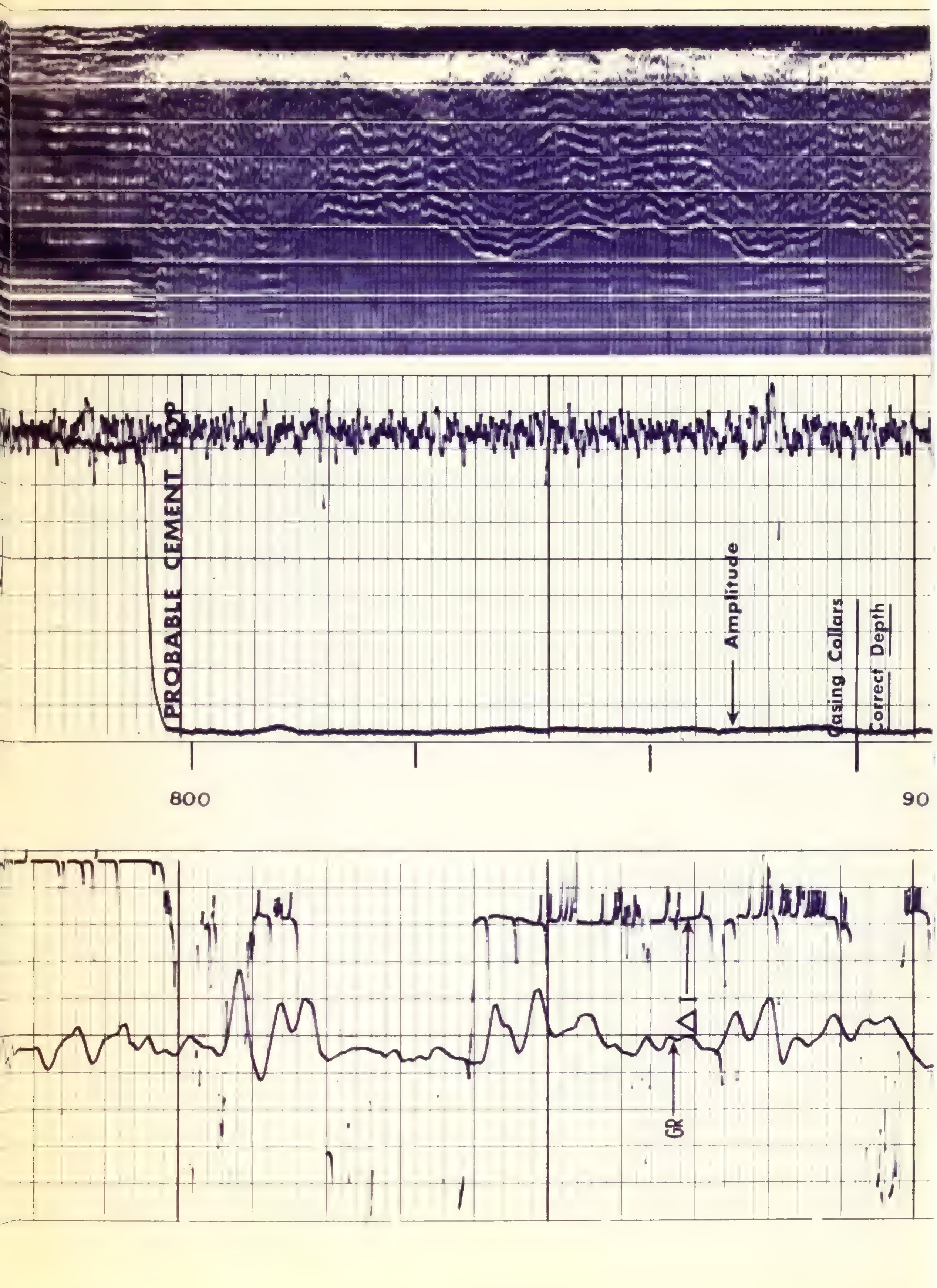
1500
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
19' Deep)
GR

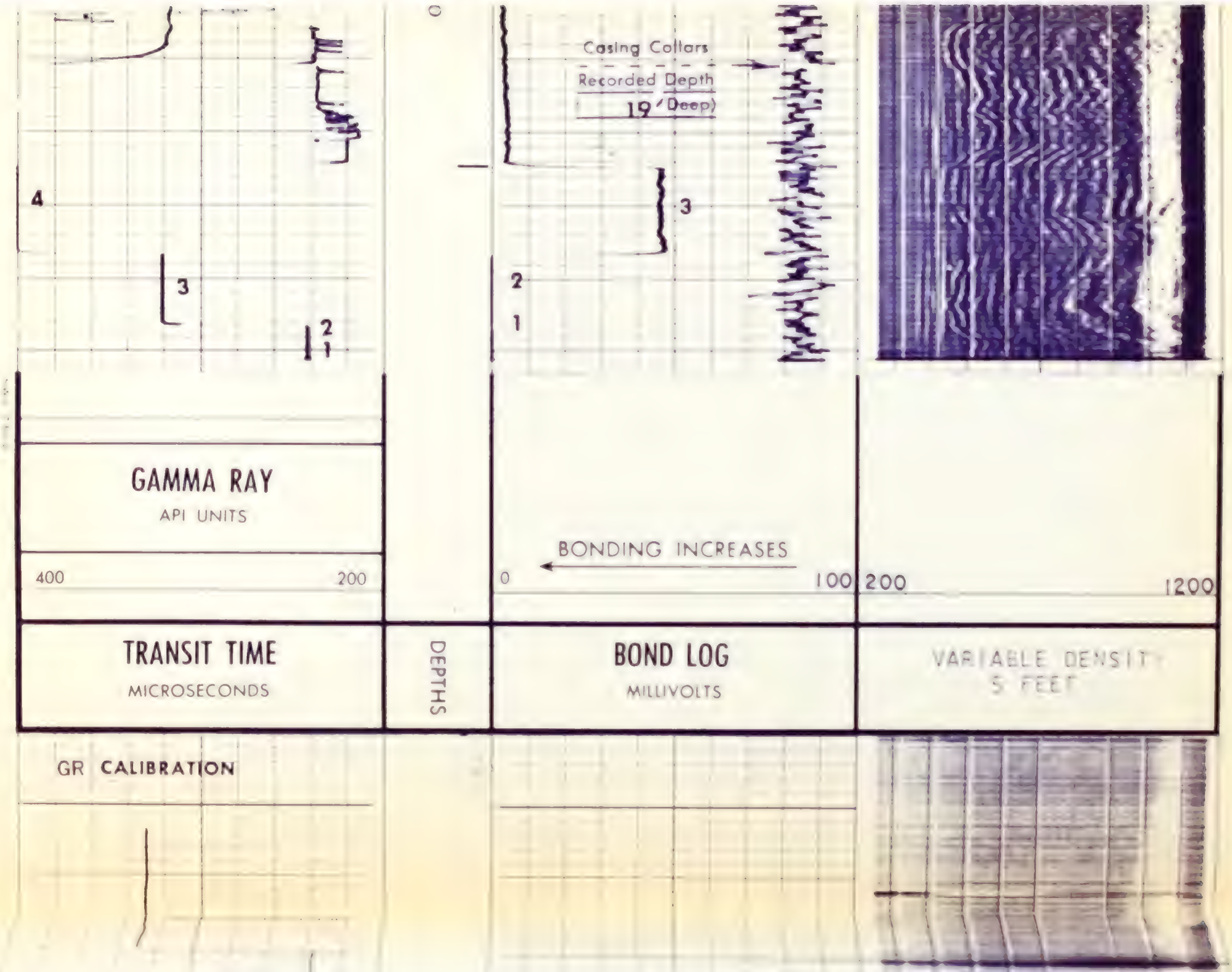

Amplitude
1600
GR FR
Amplitude FR
TDR
1

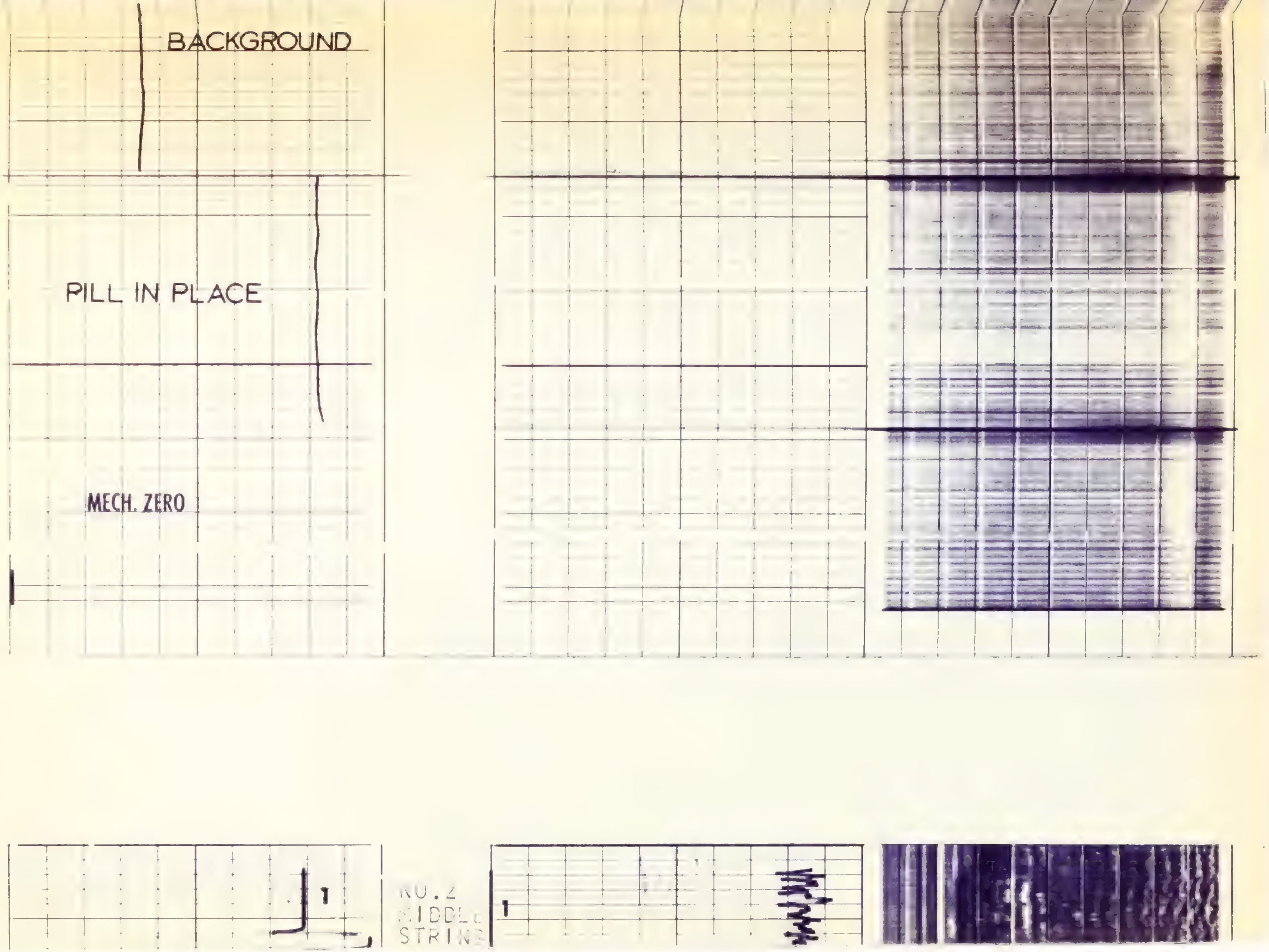

CALIBRATION
NO.1- [illegible] NG STRING
1
2
3
4
2
1

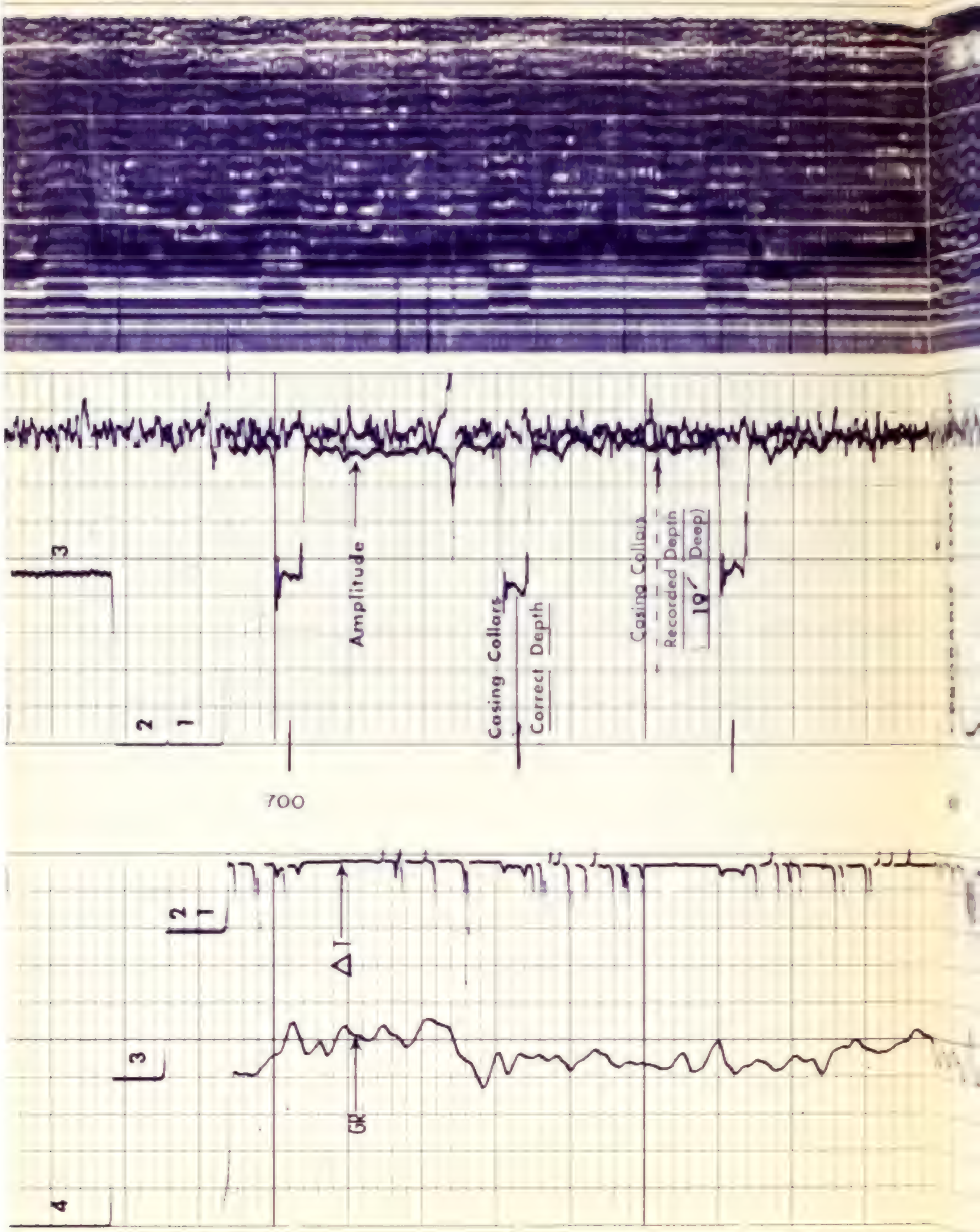
REPEAT SECTION

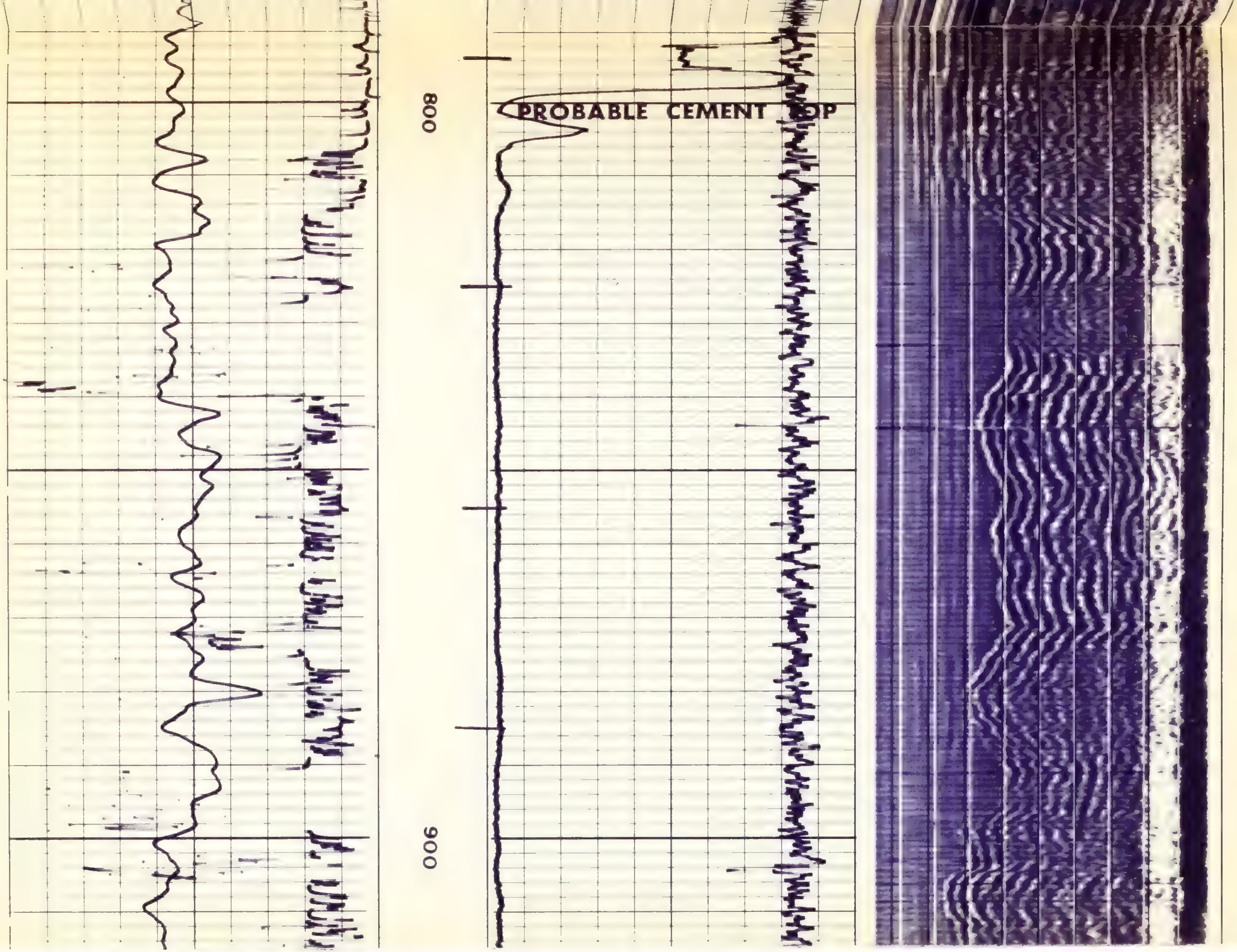


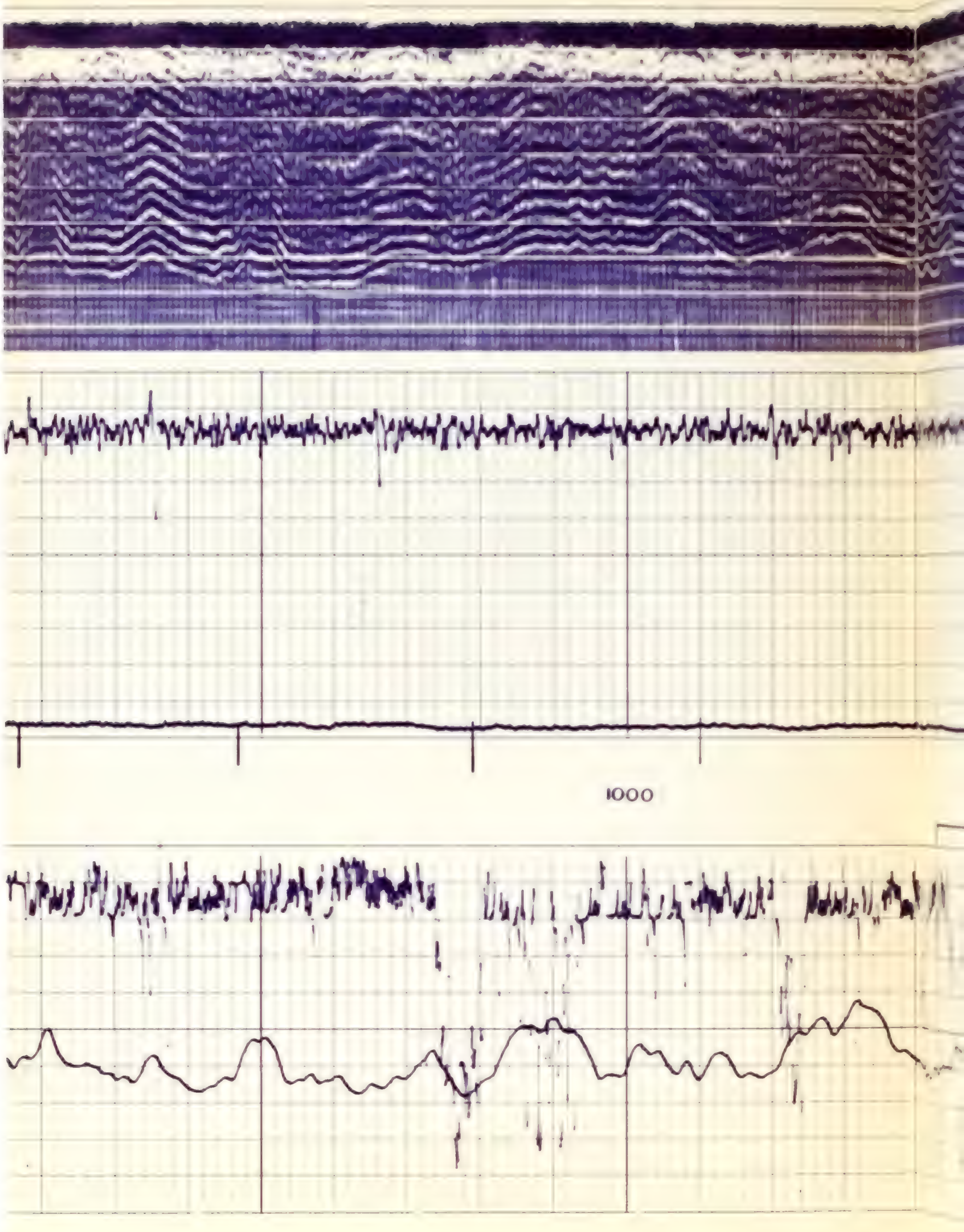

PROBABLE CEMENT TOP
Amplitude
Casing Collars
Correct Depth
800
90
ΔT
GR

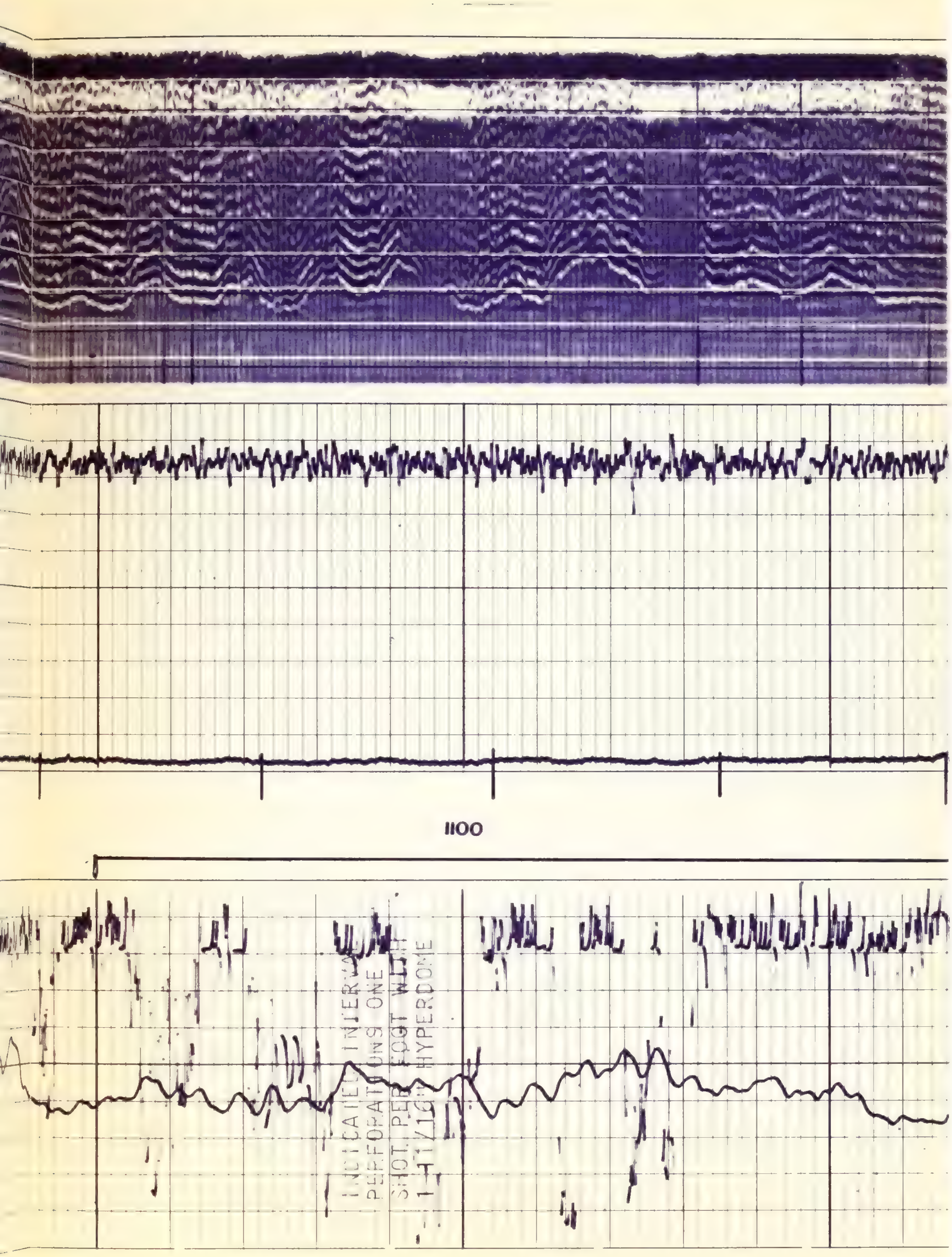

Casing Collars
Recorded Depth
19' Deep)
4
3
2
1
3
2
1
0
GAMMA RAY
API UNITS
400
200
BONDING INCREASES
0
100
200
1200
TRANSIT TIME
MICROSECONDS
DEPTHS
BOND LOG
MILLIVOLTS
VARIABLE DENSITY
5 FEET
GR CALIBRATION

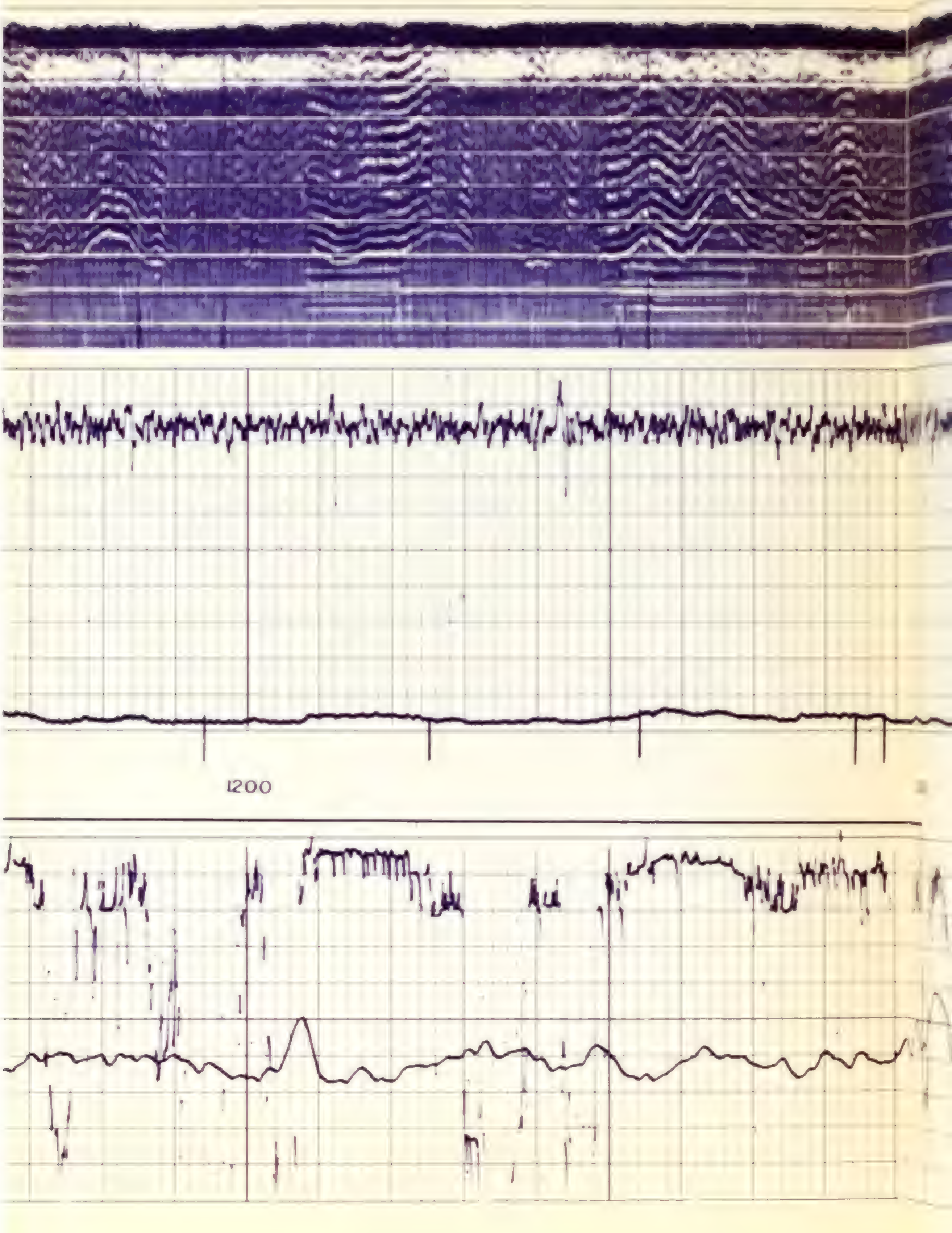

BACKGROUND
PILL IN PLACE
MECH. ZERO
NO. 2
MIDDLE
STRING

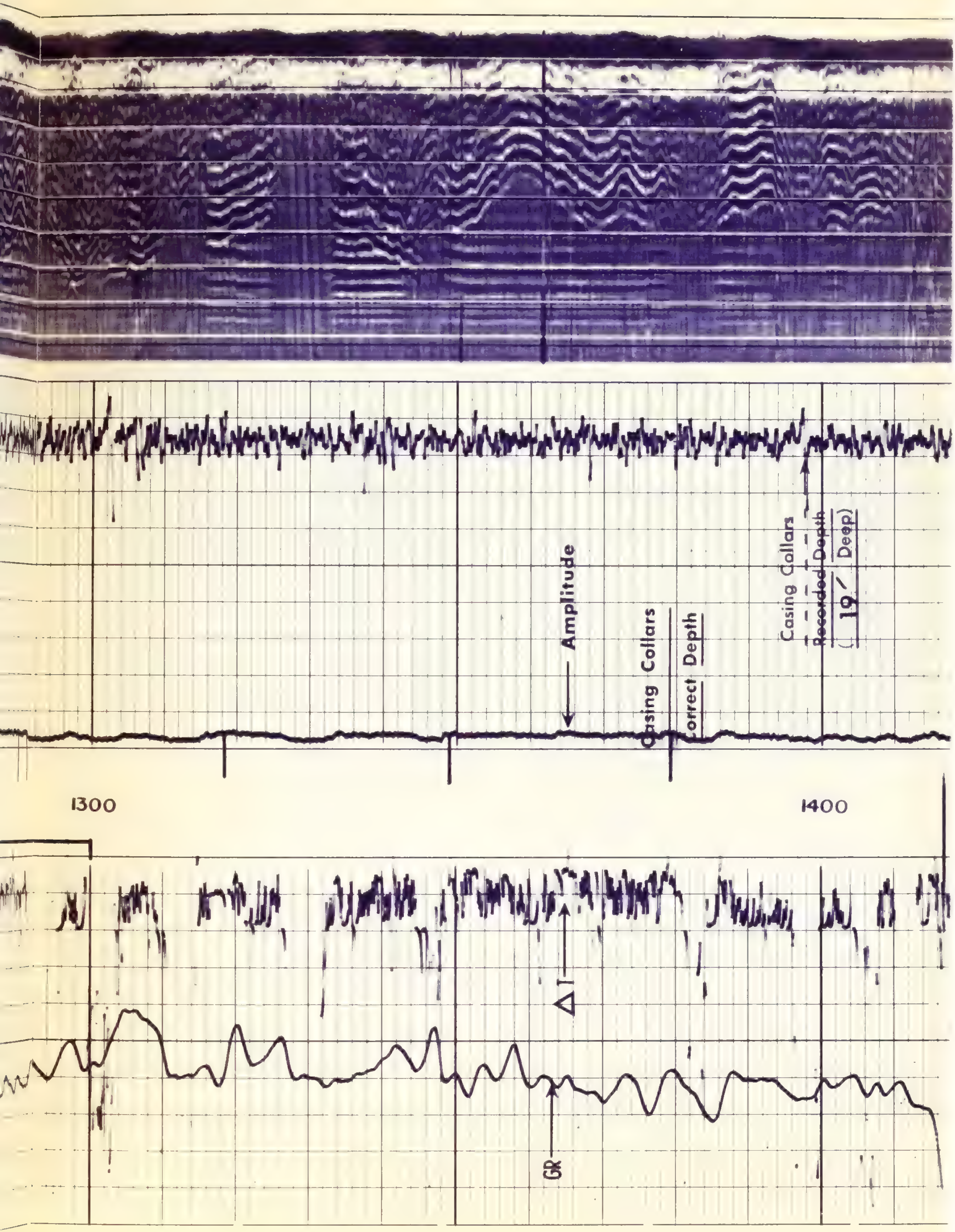

3
2
1
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
700
2
1
ΔT
GR
3
4

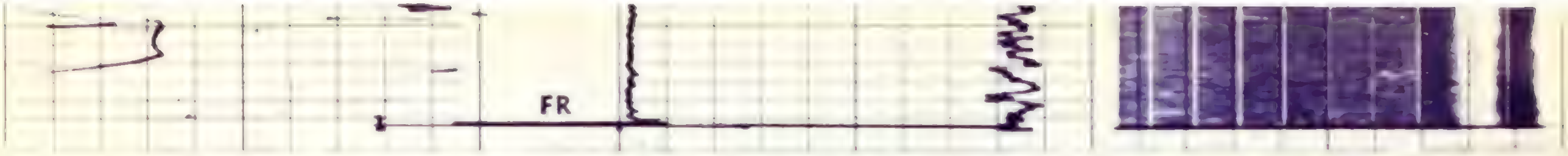

800
PROBABLE CEMENT TOP
900


1000

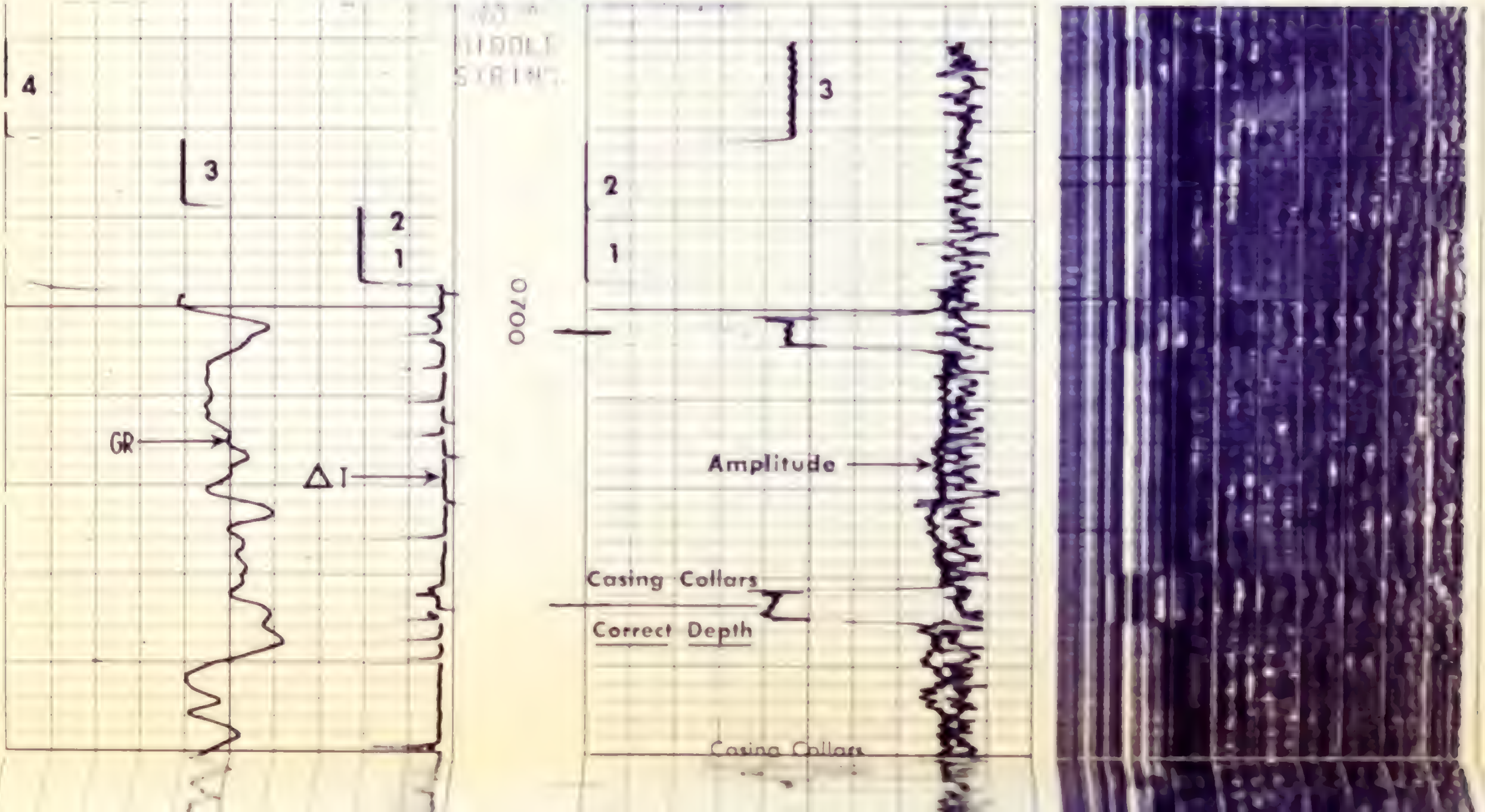

1100
INDICATED INTERVAL
PERFORATIONS ONE
SHOT PER FOOT WITH
1-11/16" HYPERDOME

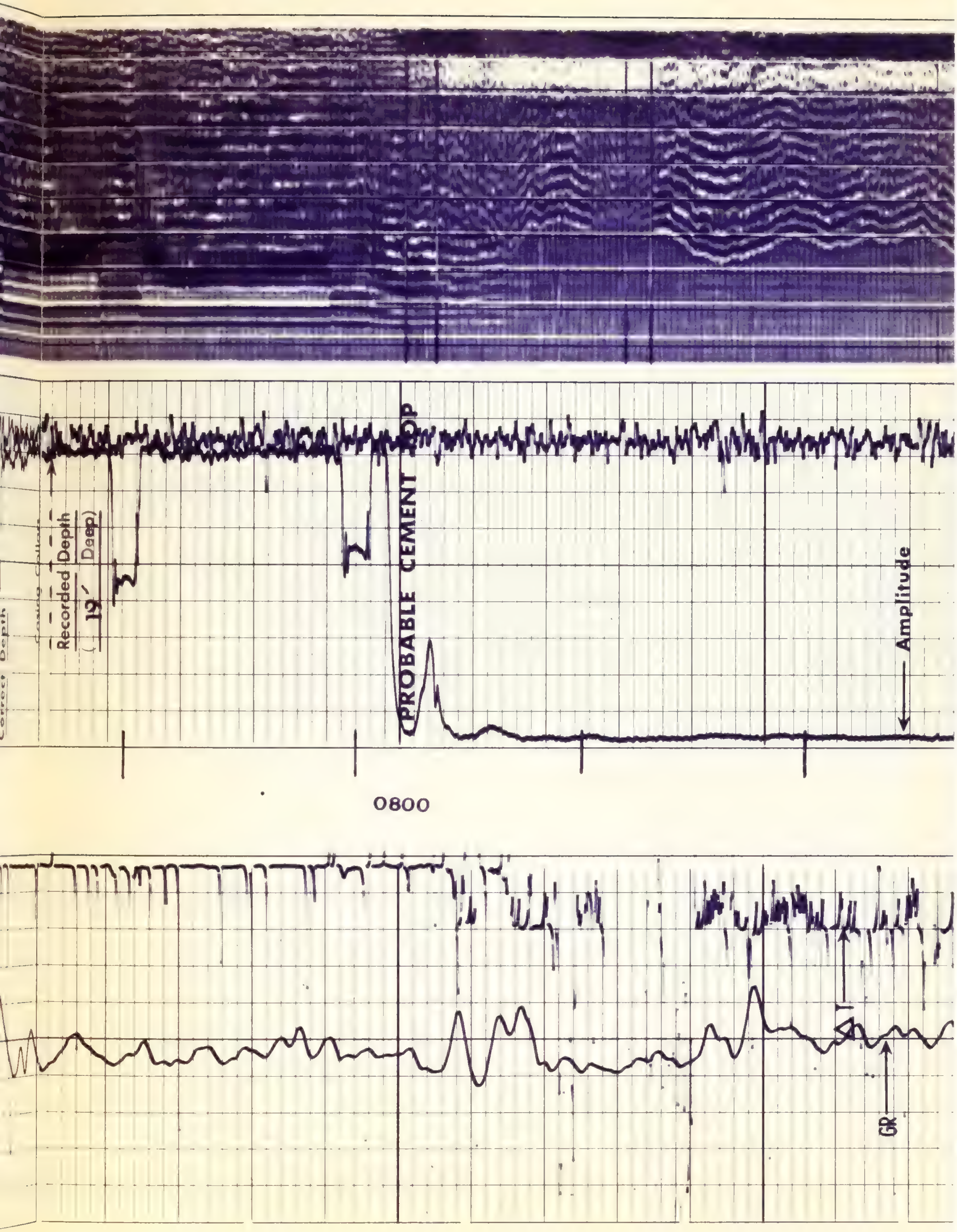

1200

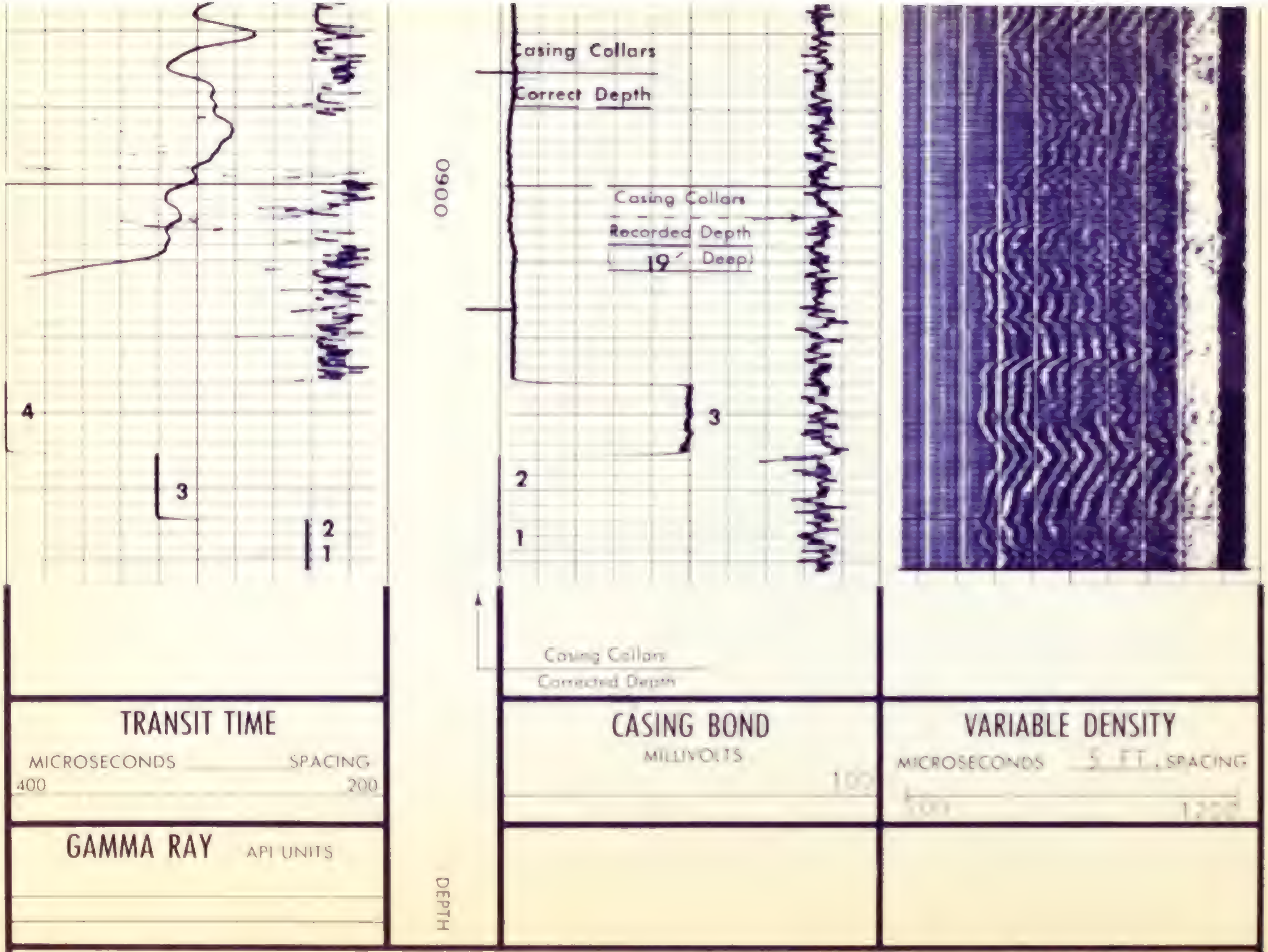

1300
1400
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
ΔT
GR



REPEAT SECTION




Correct Depth
Casing Collar
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
Amplitude
0800
GR


Casing Collars
Correct Depth
0900
Casing Collars
Recorded Depth
19´ Deep
4
3
2
1
3
2
1
Casing Collars
Corrected Depth
TRANSIT TIME
MICROSECONDS
SPACING
400
200
GAMMA RAY
API UNITS
DEPTH
CASING BOND
MILLIVOLTS
100
VARIABLE DENSITY
MICROSECONDS
5 FT. SPACING
1200

COMPANY ATLANTIC RICHFIELD, ET AL

WELL AT-1D

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1622-1430
SCHL. TD 1630-1438
DRLR TD 1640-1441
Elev:
KB ----
DF ----
GL 6903

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

Sc

[illegible]

Schlumberger

CEMENT BOND LOG

VDL/CCL

COUNTY RIO BLANCO
Field or
LOCATION
WELL CB-1
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-1

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.
1153' FSL & 1015' FWL

Sec. 1 Twp. 3S Rge. 97W

Other Services:
PDC-GR
SP-HD

Permanent Datum: GROUND LEVEL, Elev.
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6760

Date	10-16-74	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	2094	Max. Rec. Temp.	---- °F
Depth — Logger	2080	Est. Cement Top	1490
Btm. Log Interval	2072	Equip. | Location	362 | VERNAL
Top Log Interval	1250	Recorded By	ST. AUBYN
Open Hole Size	7 7/8	Witnessed By	ELLARD

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String						
Prot. String						
Prod. String	2 3/8	4.7		T-C	SURF	2103
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			120 SKS	
Type of cement			CLASS "G"	
Additive			2% CACL.	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

The well name, location and borehole reference data were furnished by the customer

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement	16:[illegible] 9-20-74	
Release pressure	17:[illegible] 9-20-74	
Start Cement Bond Log	1[illegible]:00 10-16-74	
Finish Cement Bond Log	21:[illegible] 10-16-74	

REMARKS
Service Order No. [illegible]
Csg. Collars Recorded 15 ft. [illegible]

Preceding fluid ______ Volume ______ bbls.
Cement pumped ______ bbls./minute

Pipe reciprocated during Pumping: Yes ______ No ______
Pipe reciprocated after plug down: Yes ______ min., No ______

SQUEEZE JOB DETAIL

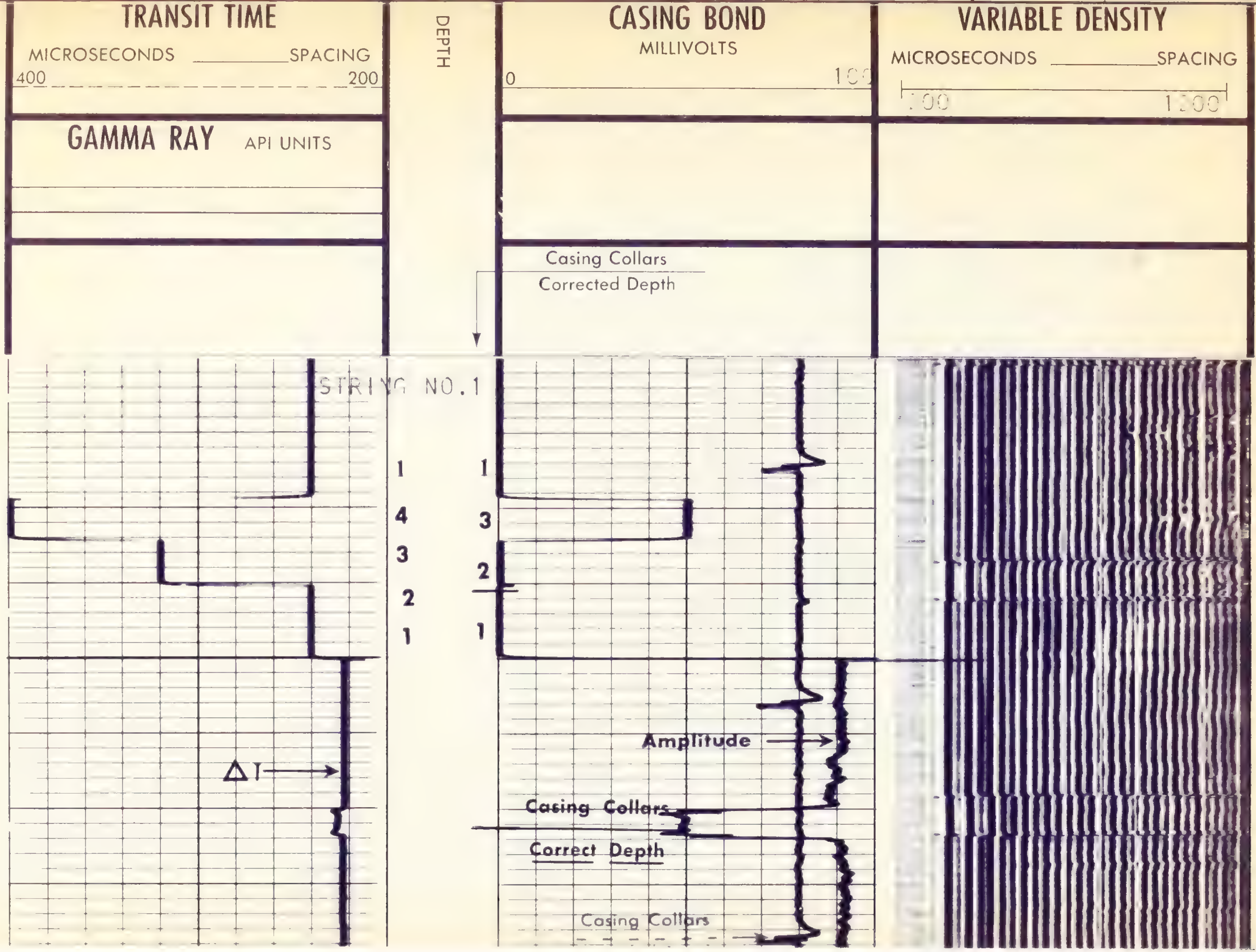
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

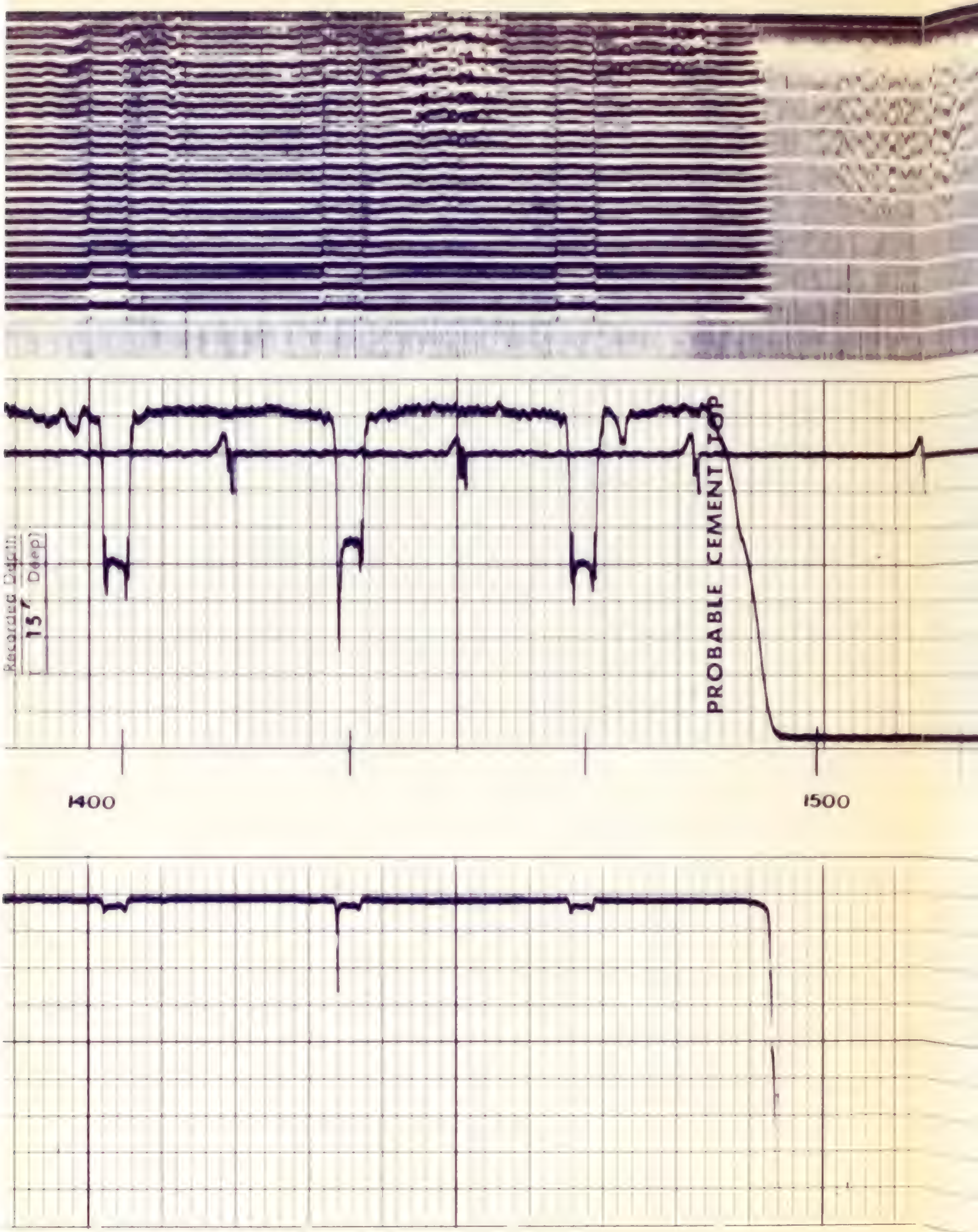
EQUIPMENT DATA

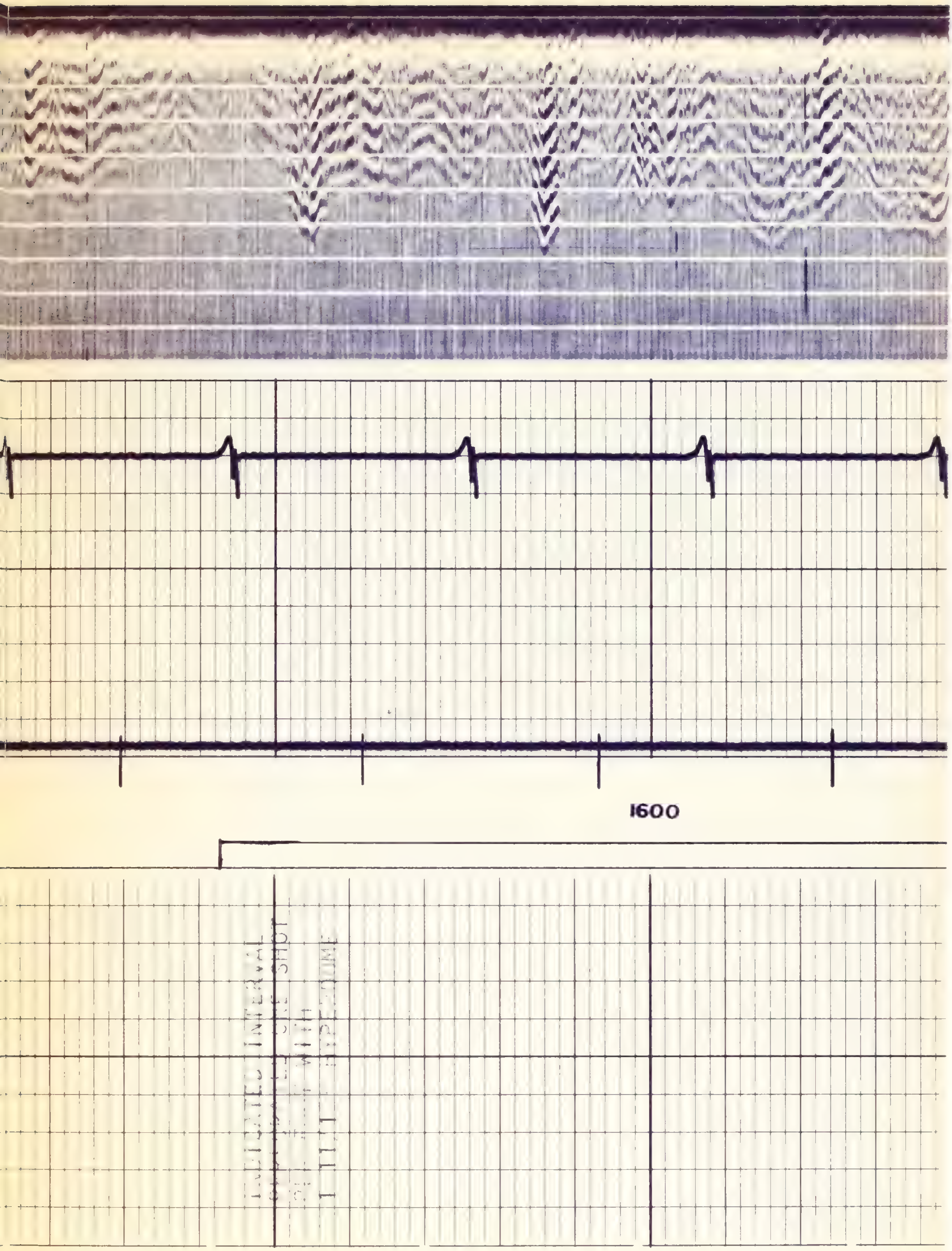
	Centralizer Depths	Scratcher Depths
Sonic Panel No.	[illegible]	
Sonic Cart No.	[illegible]-3 A	
Sonic Sonde No.	[illegible]	
CRP No.	1[illegible]	
Mem Panel No.	[illegible]	
GR Panel No.	[illegible]P-[illegible]	
GR Cart No.	[illegible]-AFA-1	
Centralizer: Type	CAL-A	[illegible]
No.	CME-[illegible]	
To Level (MV)	1[illegible]	
Cart. Gain	1[illegible]	
CRP Intensity	.1	
R9G Intensity	[illegible]	
Logging Speed	33 FPM	
Time Constant		

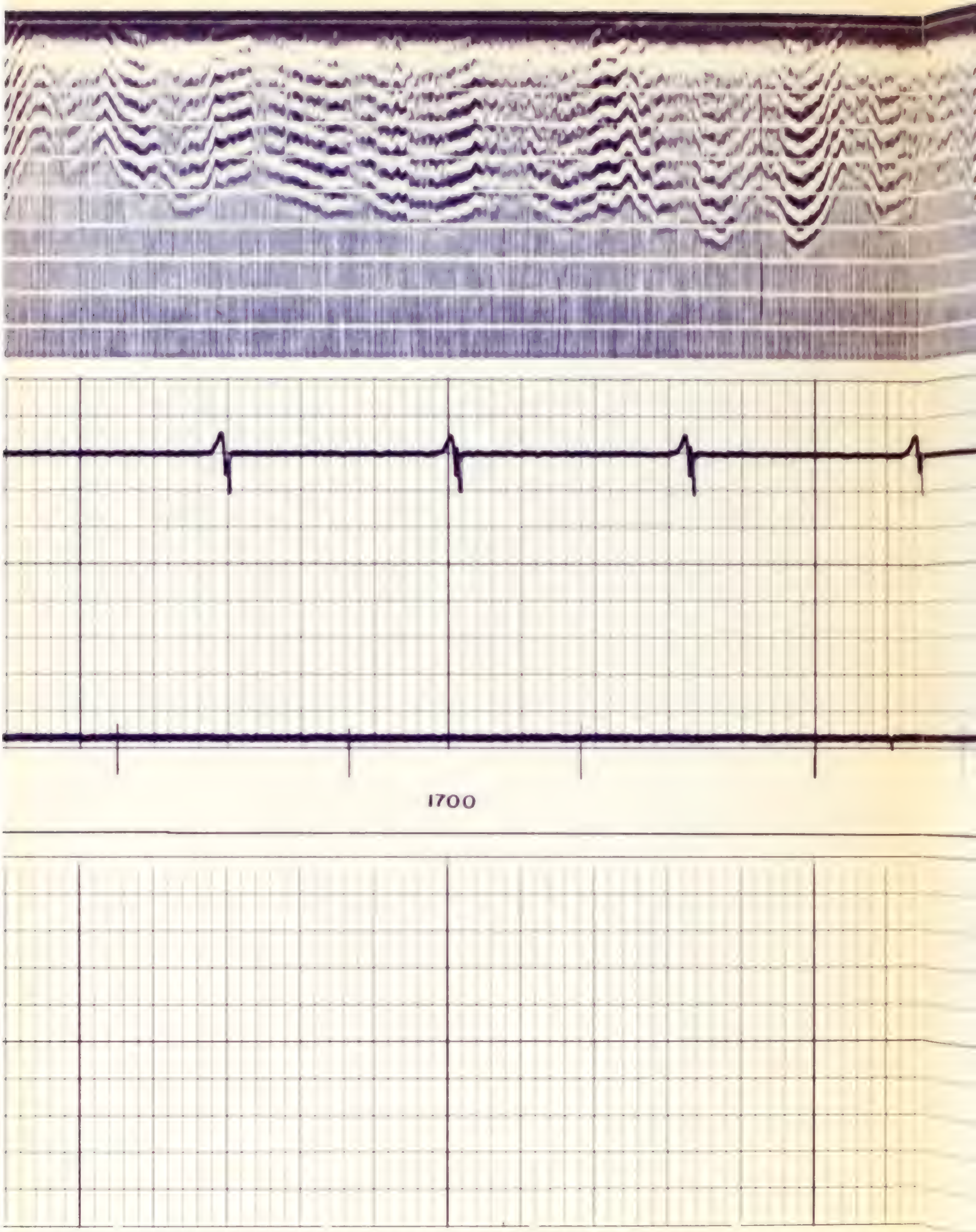
AVERAGE WELL DRIFT:
from ______ to ______ ; from ______ to ______ ; from ______ to ______

TRANSIT TIME | CASING BOND | VARIABLE DENSITY
GAMMA RAY


TRANSIT TIME
MICROSECONDS
SPACING
400
200
GAMMA RAY
API UNITS
DEPTH
CASING BOND
MILLIVOLTS
0
100
VARIABLE DENSITY
MICROSECONDS
SPACING
1200
Casing Collars
Corrected Depth
STRING NO. 1
1
4
3
2
1
1
3
2
1
ΔT
Amplitude
Casing Collars
Correct Depth
Casing Collars


Recorded Depth
15' Deep
PROBABLE CEMENT TOP
1400
1500


1600
INDICATED INTERVAL
SHOT
WITH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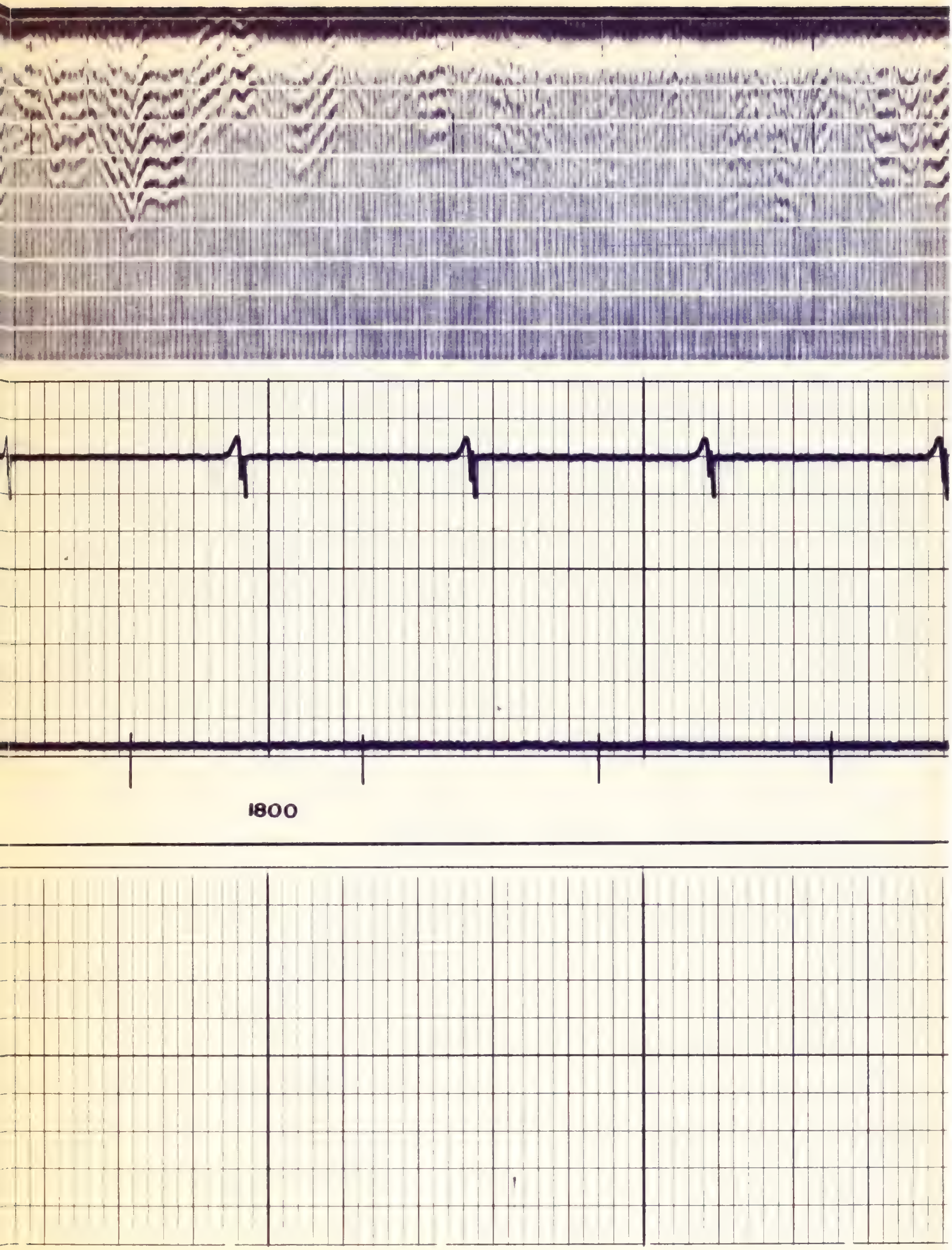
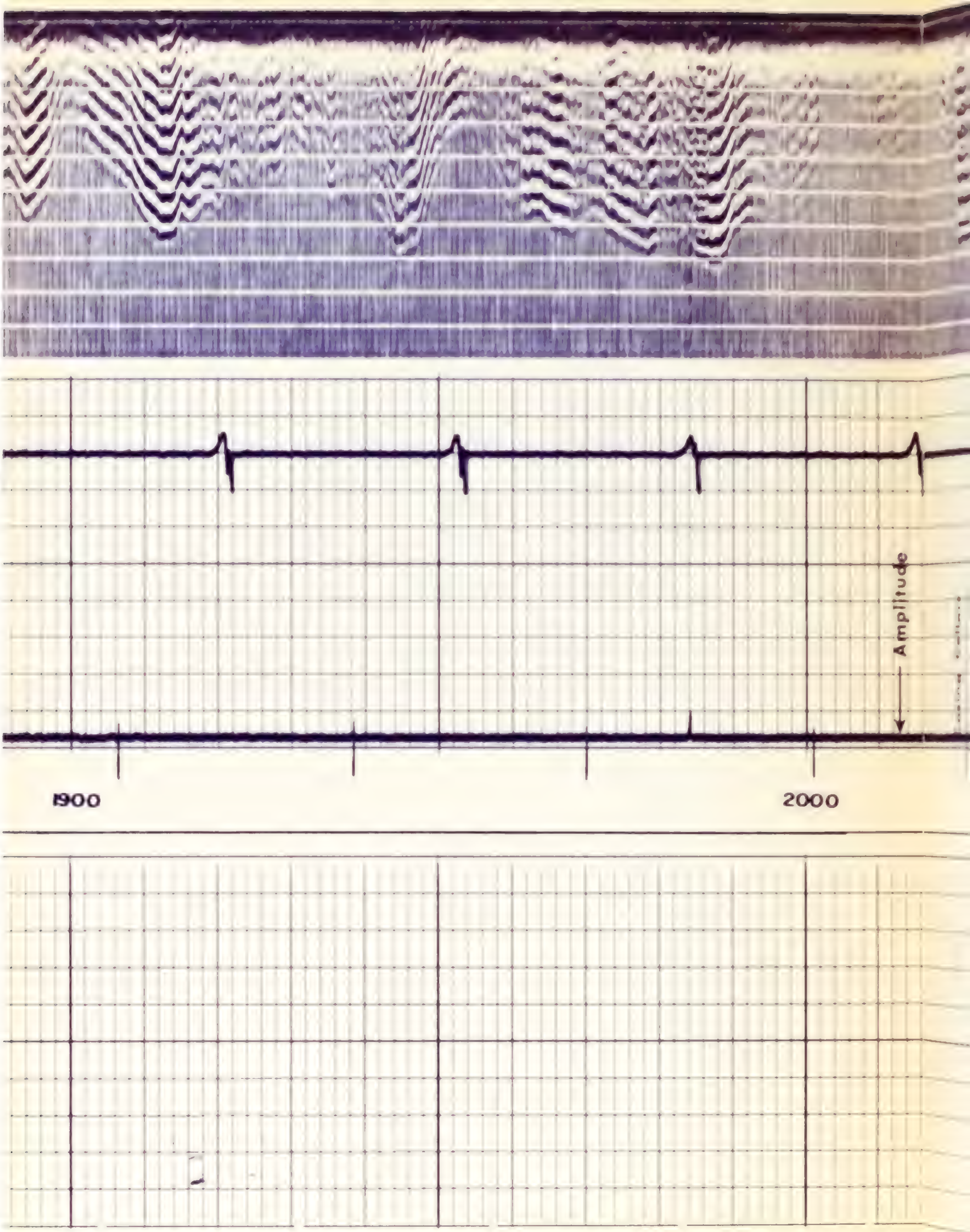
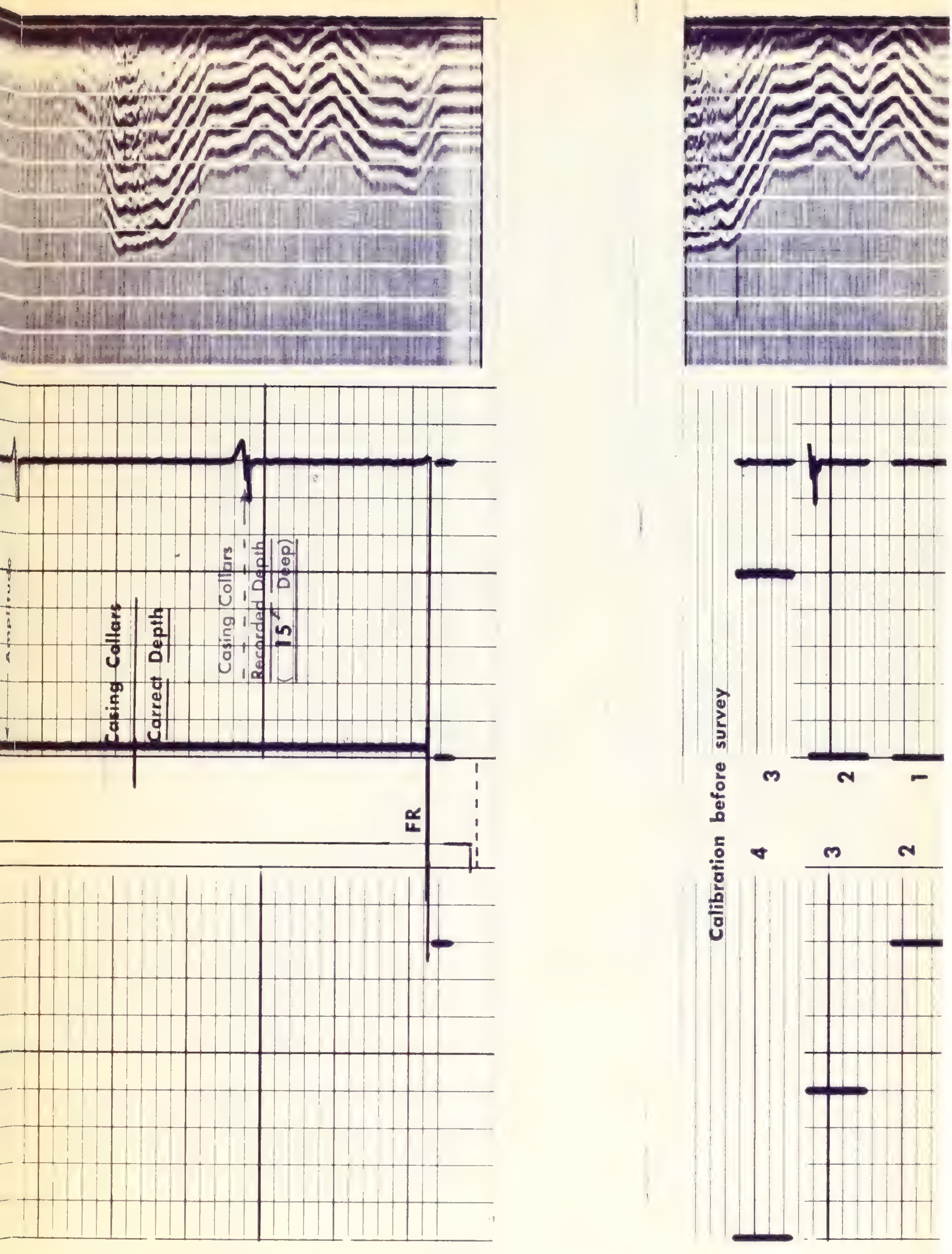
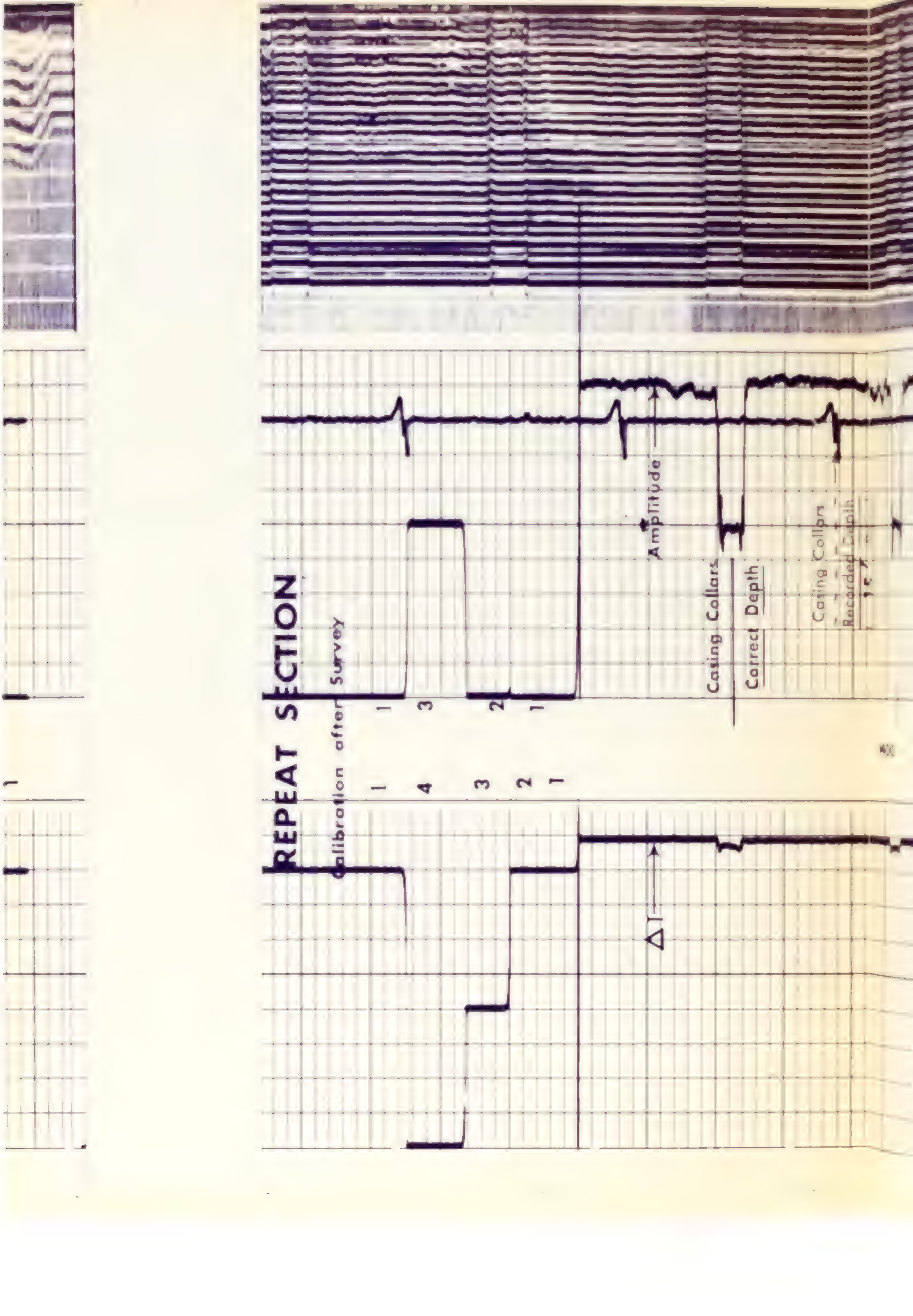
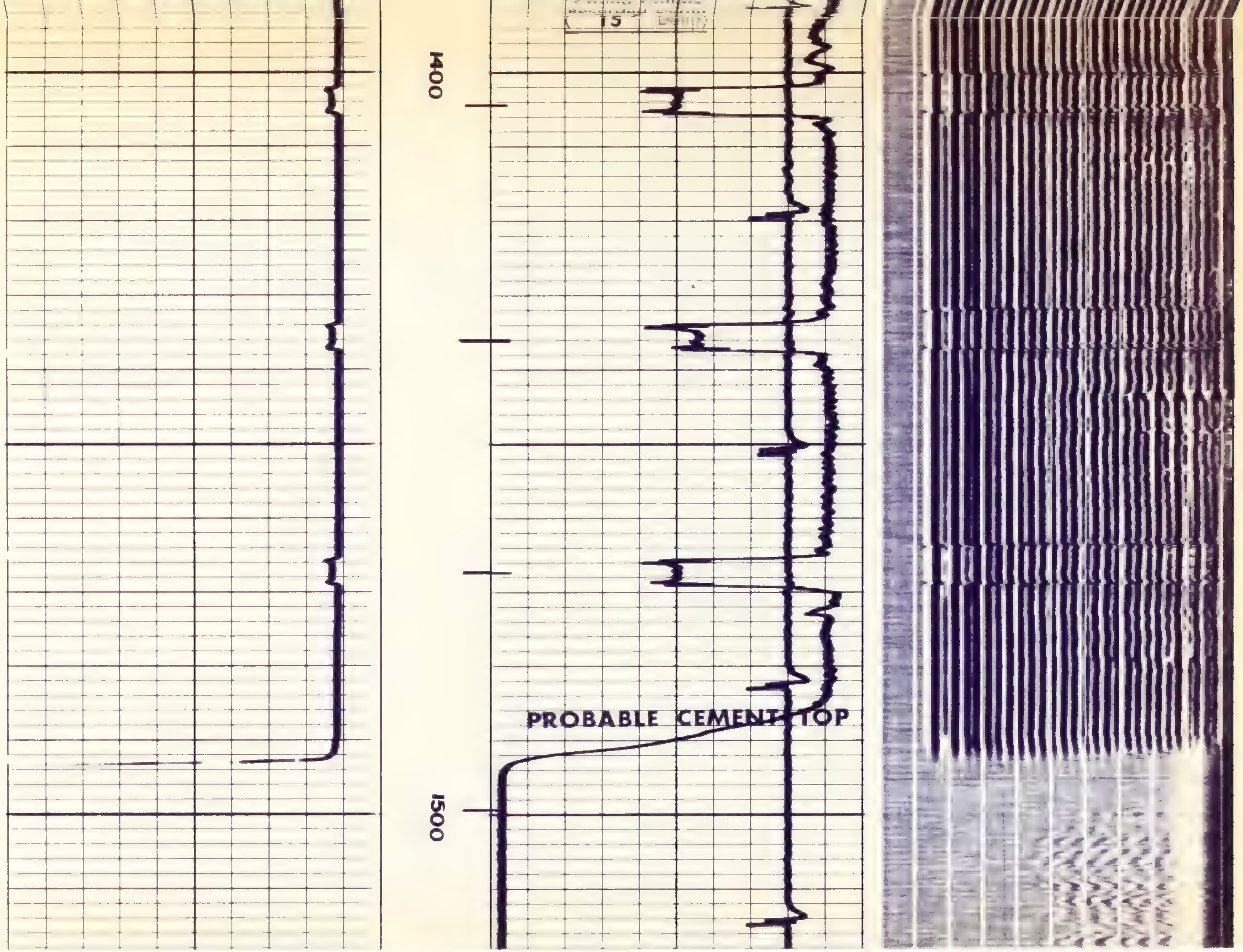
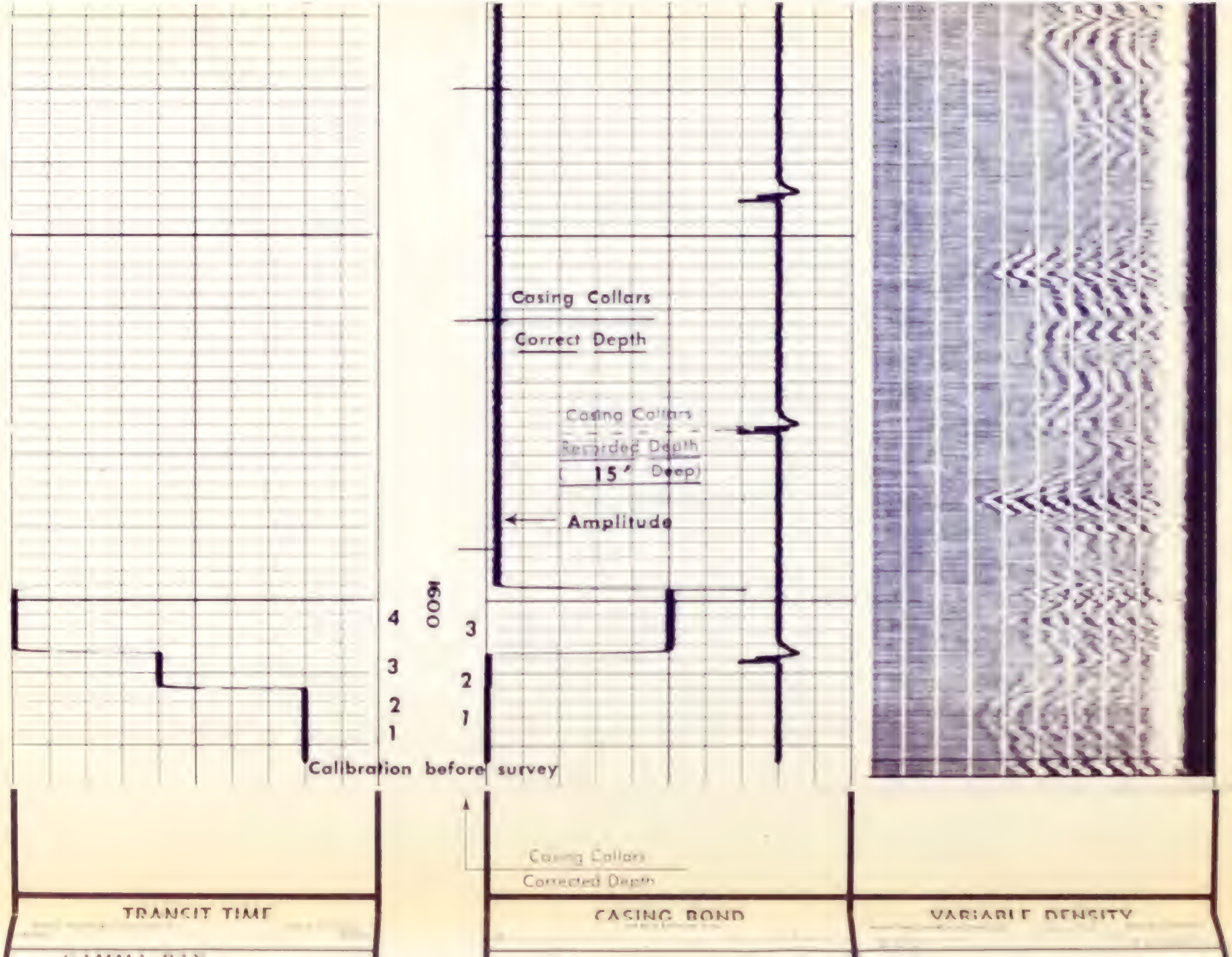

1800


Amplitude
1900
2000


Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
FR
Calibration before survey
4
3
3
2
2
1


REPEAT SECTION
Calibration after Survey
1
4
3
2
1
1
3
2
1
Amplitude
ΔT
Casing Collars
Correct Depth
Casing Collars
Recorded Depth


15
1400
PROBABLE CEMENT TOP
1500


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
1600
4
3
2
1
3
2
1
Calibration before survey
Casing Collars
Corrected Depth
TRANSIT TIME
CASING BOND
VARIABLE DENSITY

TRANSIT TIME

MICROSECONDS ______ SPACING

400 - - - - - - - - - - 200

GAMMA RAY API UNITS

DEPTH

CASING BOND

MILLIVOLTS

0 ________ 100

VARIABLE DENSITY

MICROSECONDS 5 FT. SPACING

200 ________ 1200

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-1

FIELD

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2072
SCHL. TD 2080
DRLR TD 2094
Elev:
KB ----
DF ----
GL ----

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

S

Schlumberger

CASING COLLAR LOG AND PERFORATING RECORD

COUNTY RIO BLANCO
FIELD or LOCATION
WELL CB-1
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-1

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location: [illegible] FSL & 1015' FWL

Sec. 1 Twp. 3S Rge. 97W

Other Services:
PDC-GR
CP-HD

Permanent Datum: GROUND LEVEL ; Elev.: 6760
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6760

Date 10-17,18,19-74 | Run No. ONE

PLUG BACK TOTAL DEPTH | DRILLER- 2094 | LOGGER- 2000

DEPTHS BELOW RELATE TO: OPEN HOLE LOG MEASUREMENTS: ☐
: RADIOACTIVITY LOG MEASUREMENTS: ☒
: SCHLUMBERGER LINE MEASUREMENTS: ☐

CASING COLLARS		PERFORATING DATA				
		No.Shots	From	To	Gun Type	Gun Size
[illegible]	[illegible]	[illegible]	1540	2079	HYPERDOME	1 11/16"
[illegible]	[illegible]					
[illegible]	[illegible]					
[illegible]	[illegible]					
[illegible]	2061					

BORE HOLE RECORD			CASING RECORD				
Hole Size	From	To	Size	Type	Weight	From	To
[illegible]	SURF	TD	[illegible]		4.7	SURF	[illegible]

HOLE FLUID DATA
Type Fluid: WATER
Density:
Fluid Level: [illegible]

Opr. Rig Time: 4 HOURS
Truck No. [illegible]
Location: VERNAL
Recorded By: [illegible]. AUSTIN
Witnessed By: [illegible]. ELLARS

The well name, location and borehole reference data were furnished by the customer.

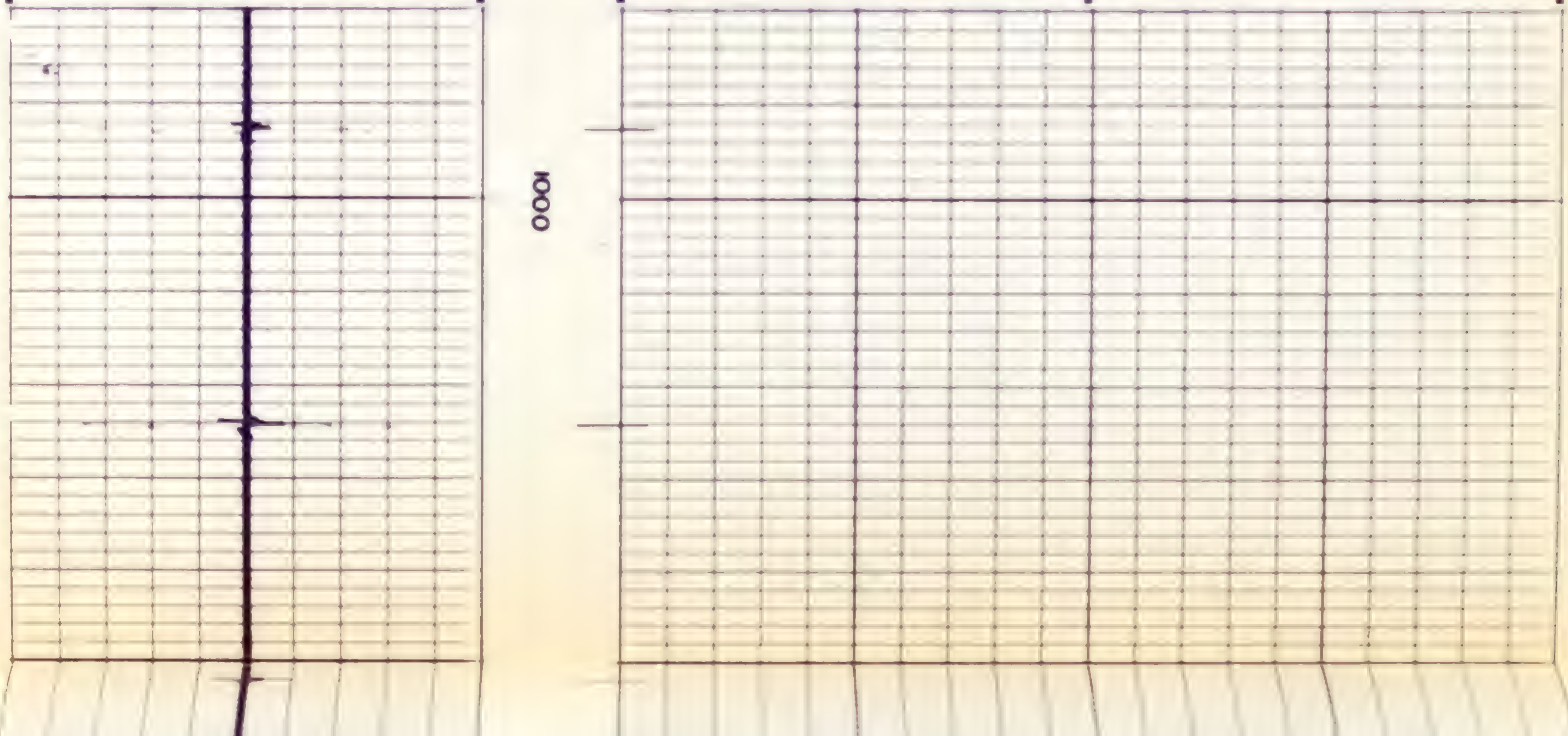
FOLD HERE

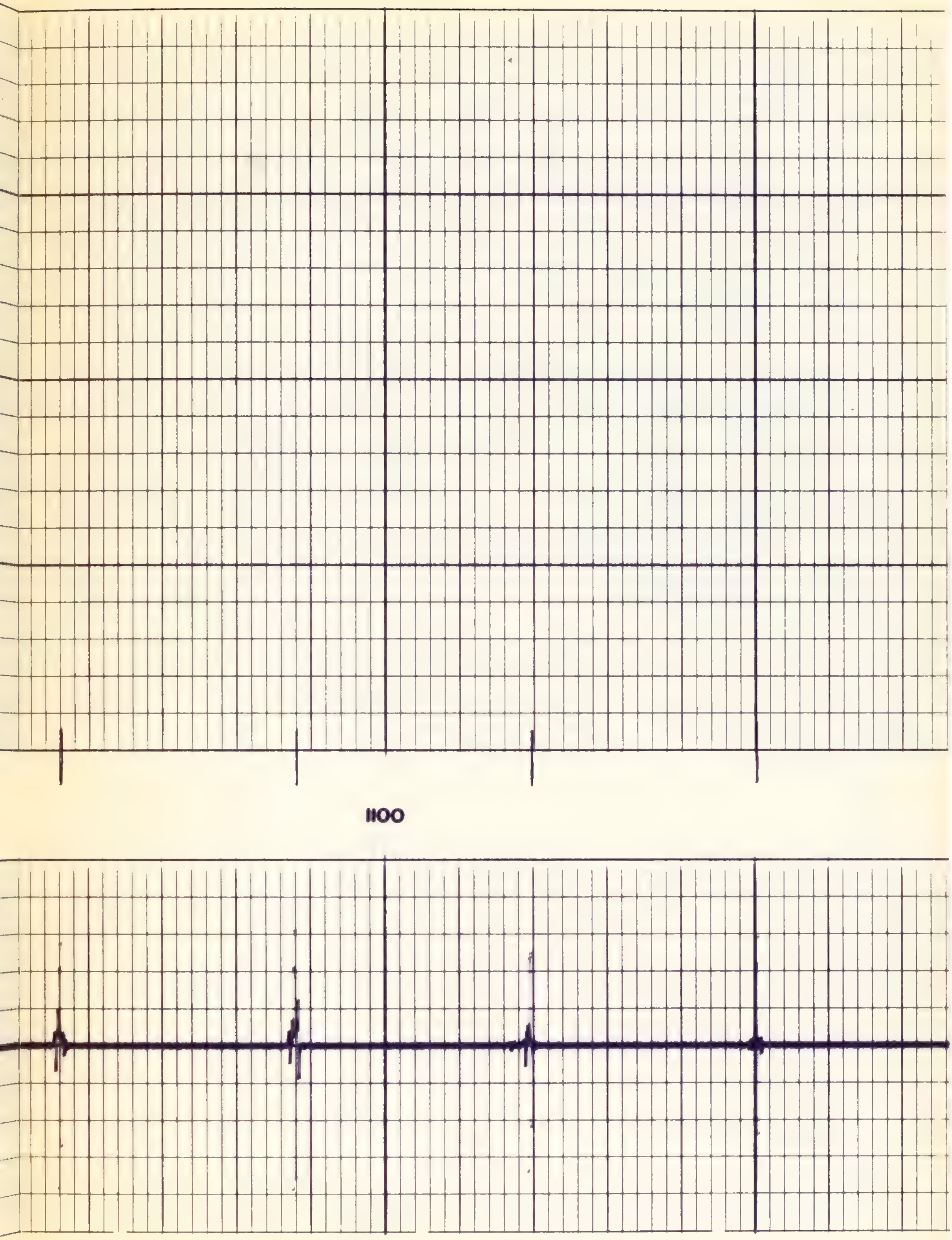
REMARKS

API Serial No.
Service Order No. [illegible]

CASING COLLAR LOG
BEFORE PERFORATION

DEPTHS

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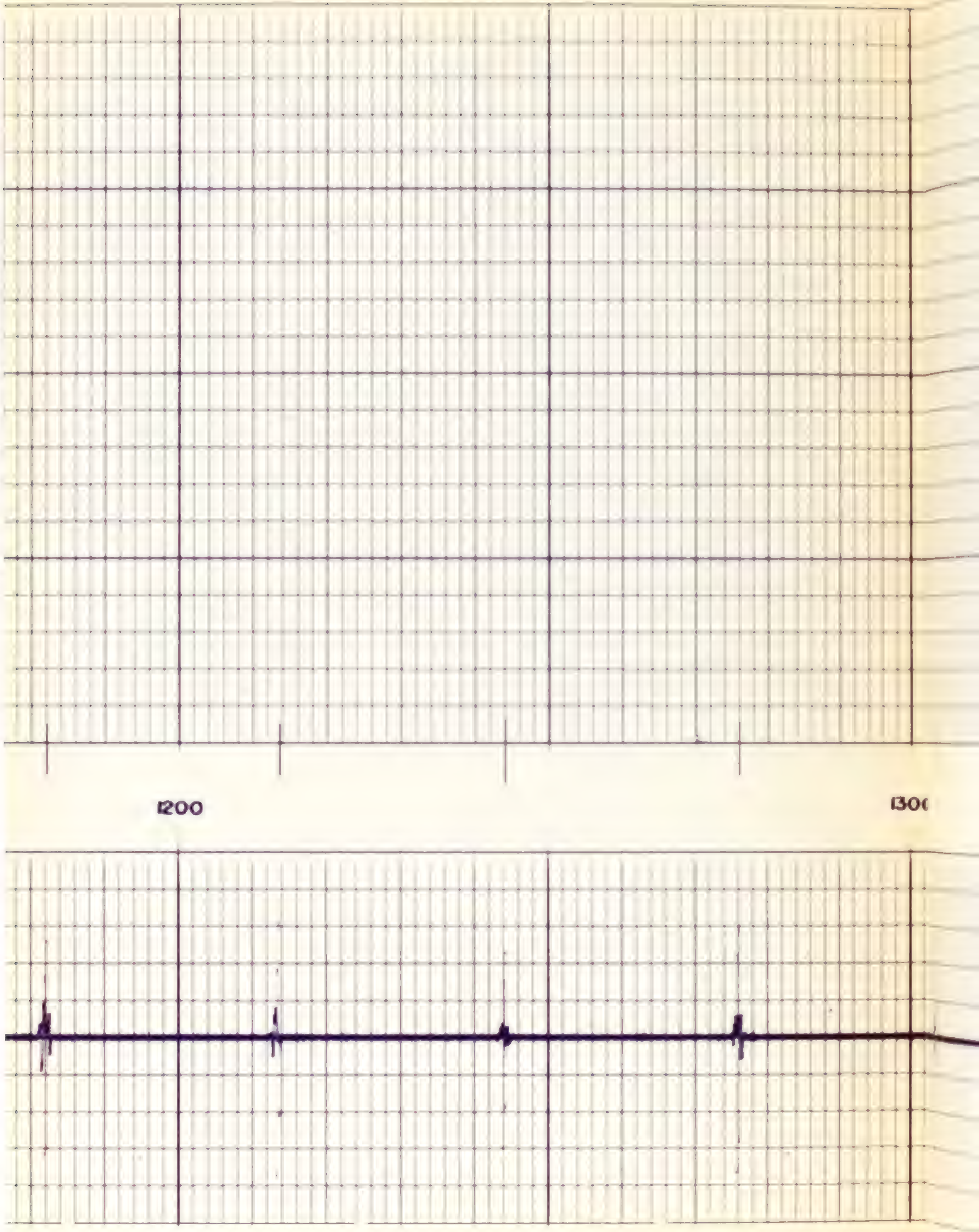
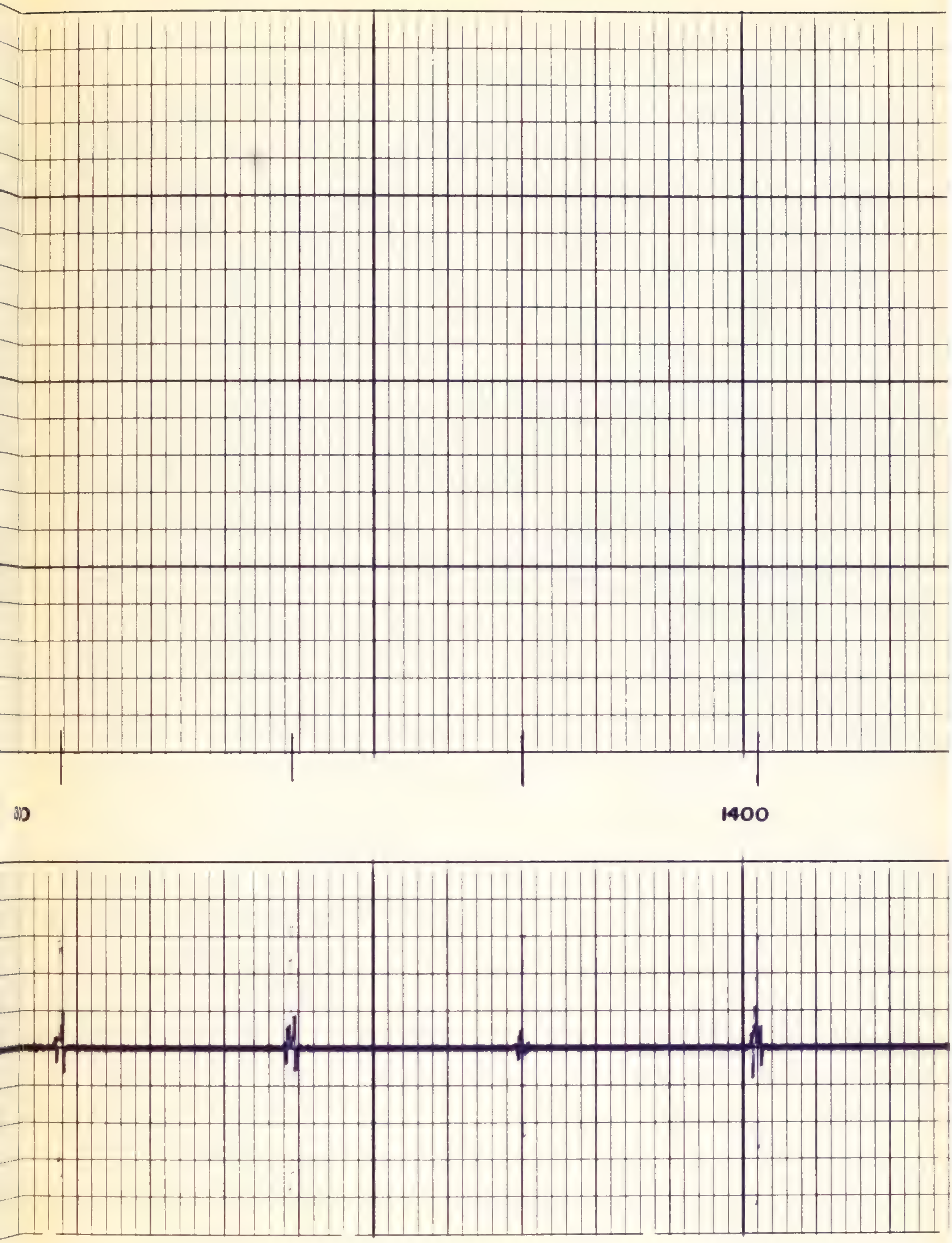

1200
130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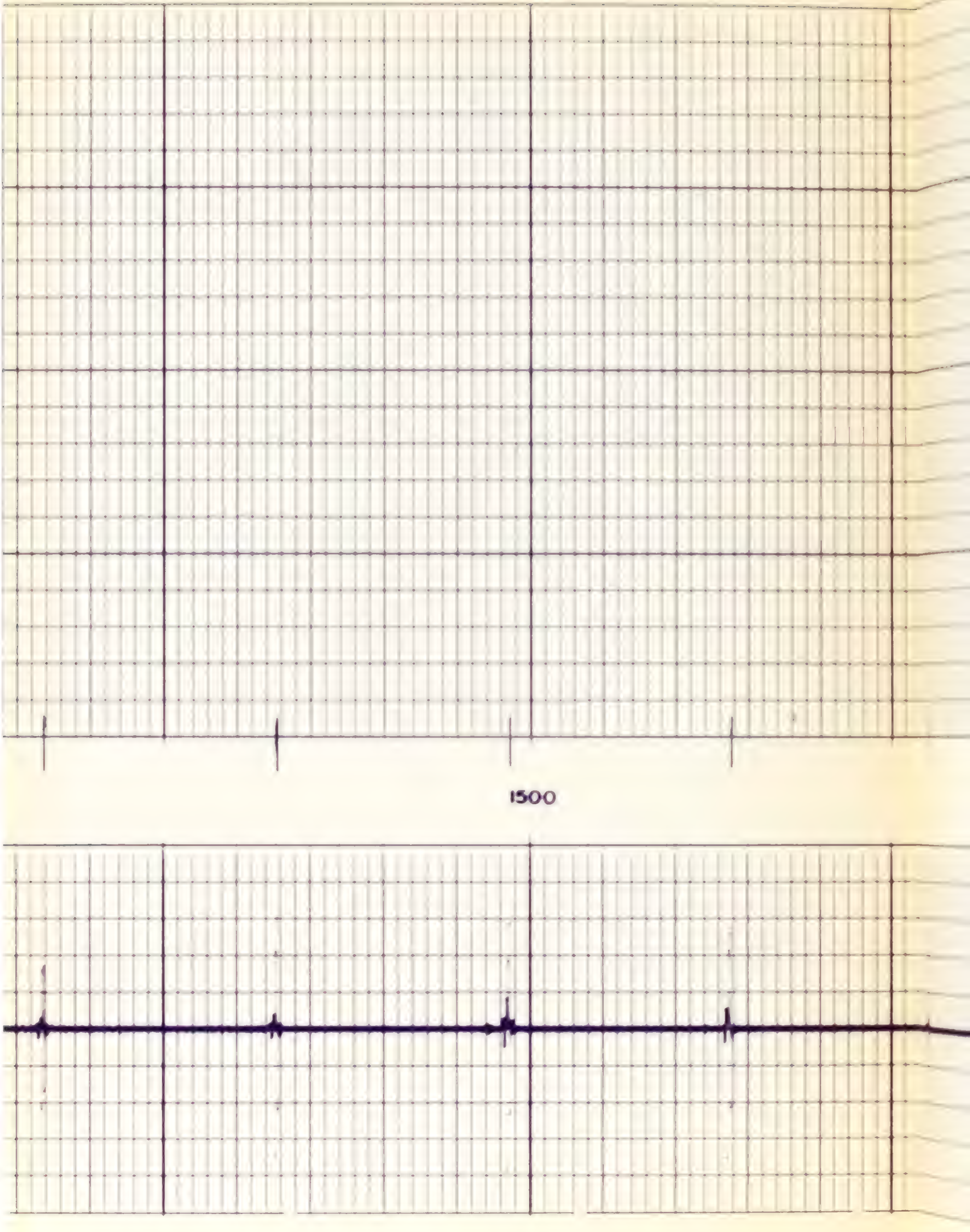
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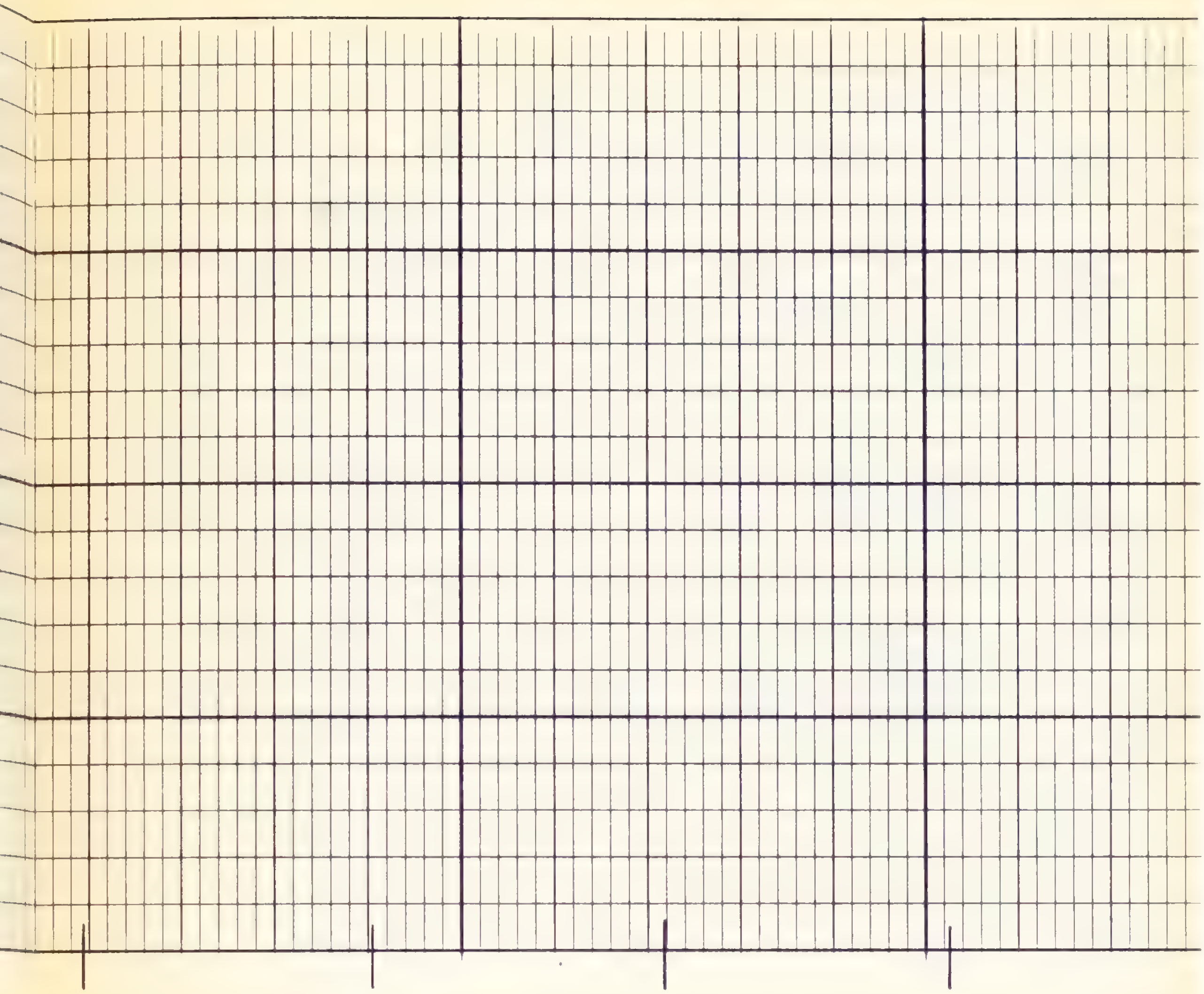
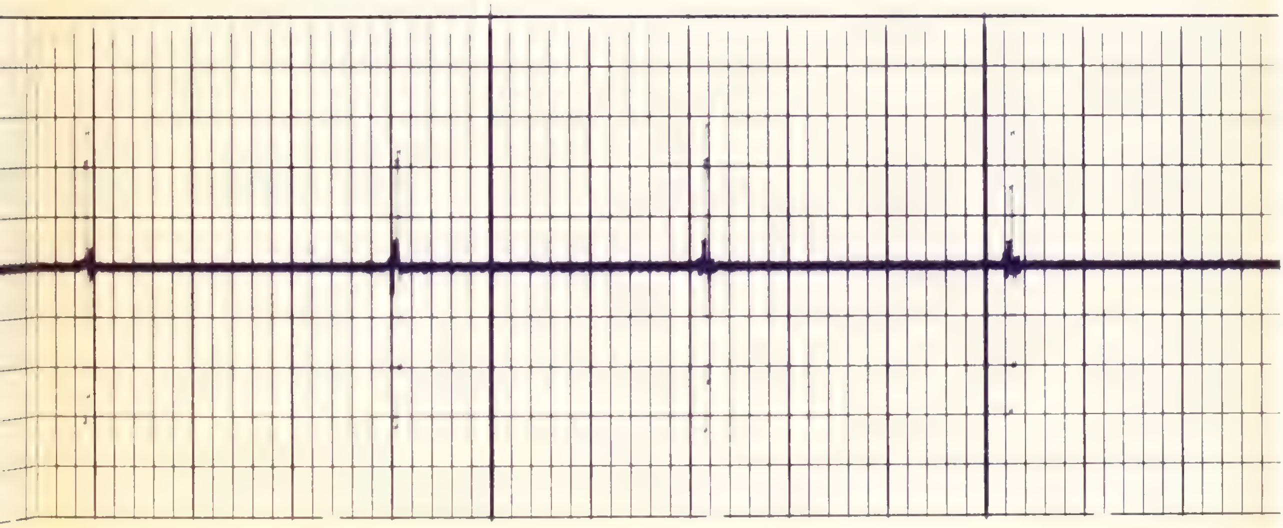
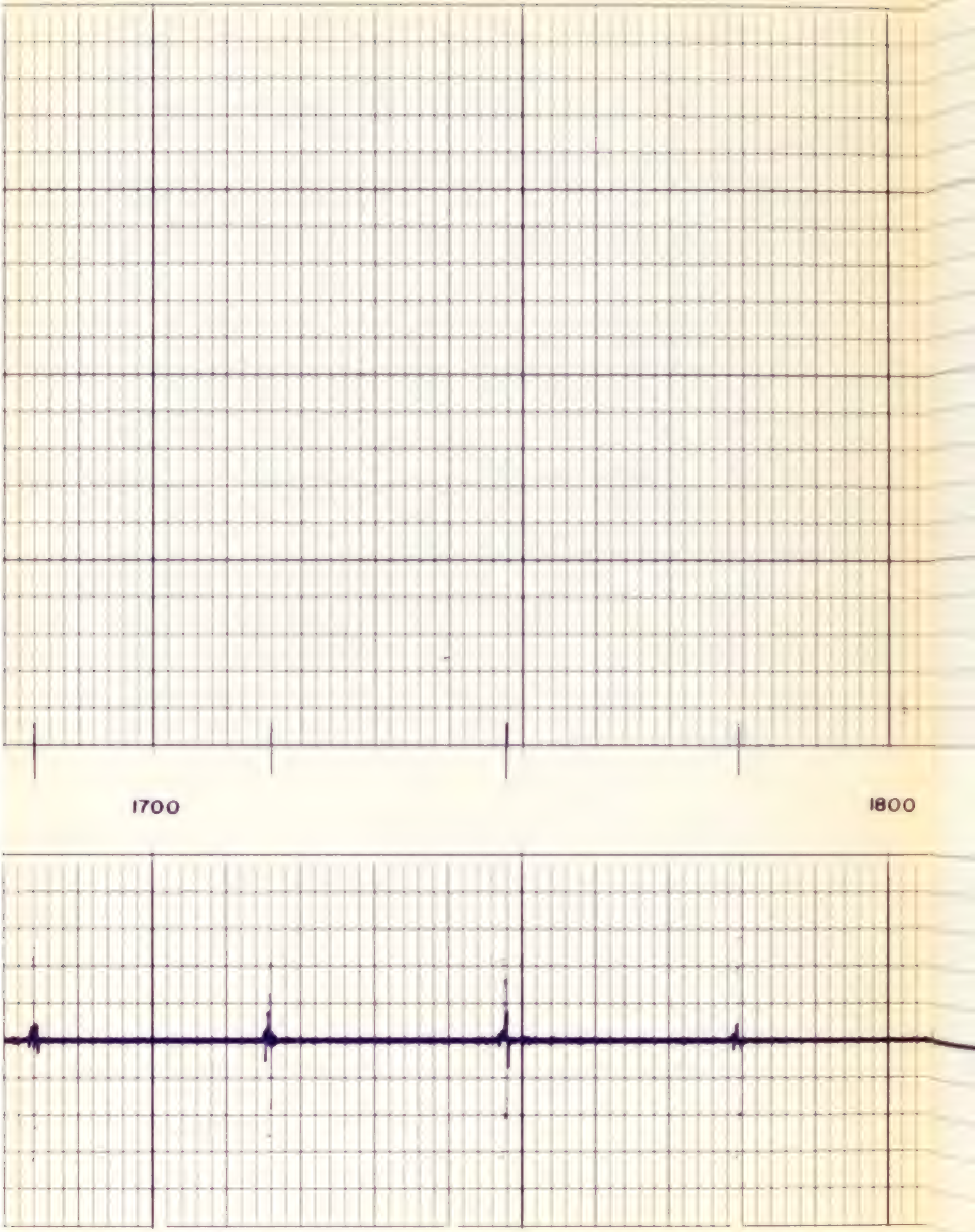
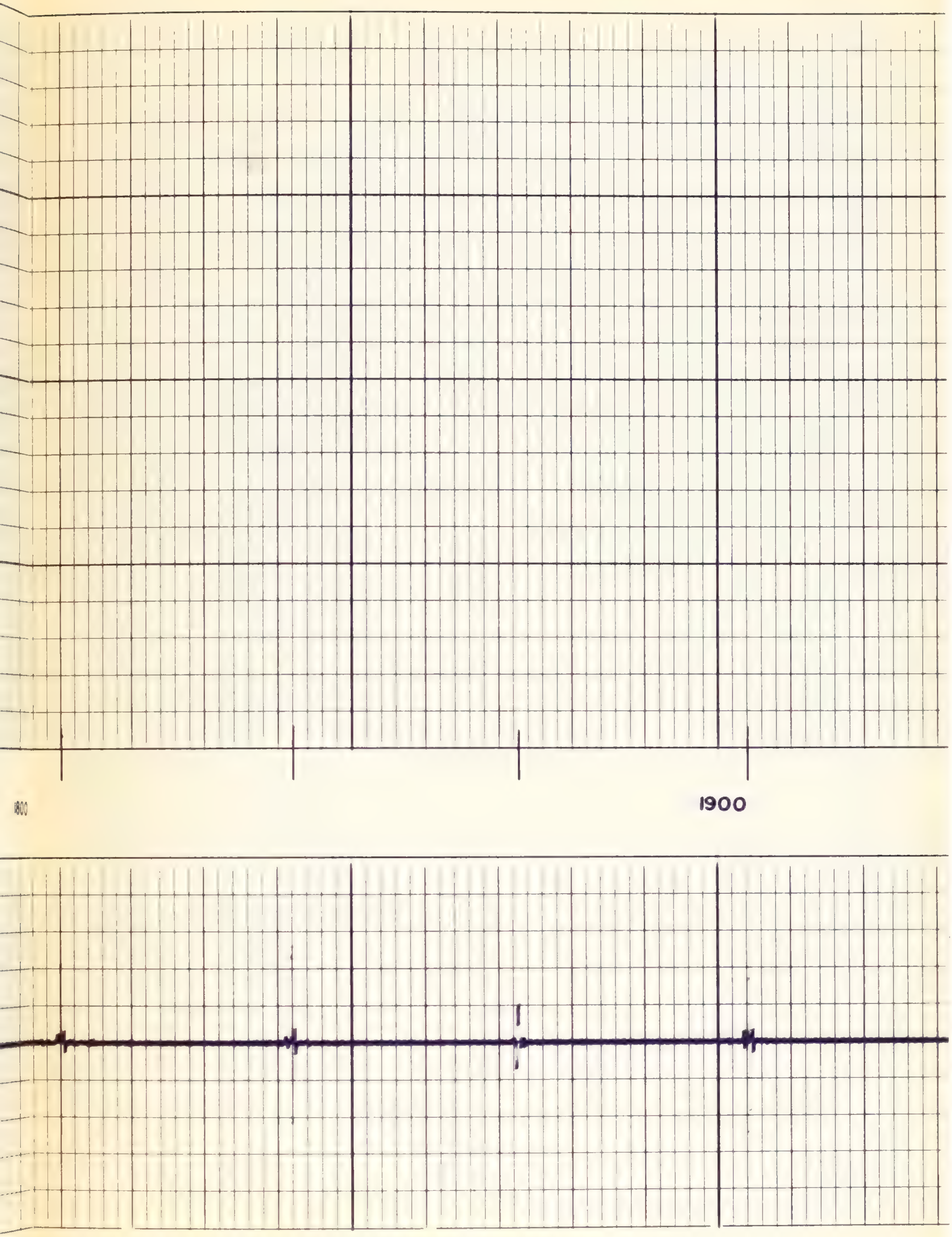
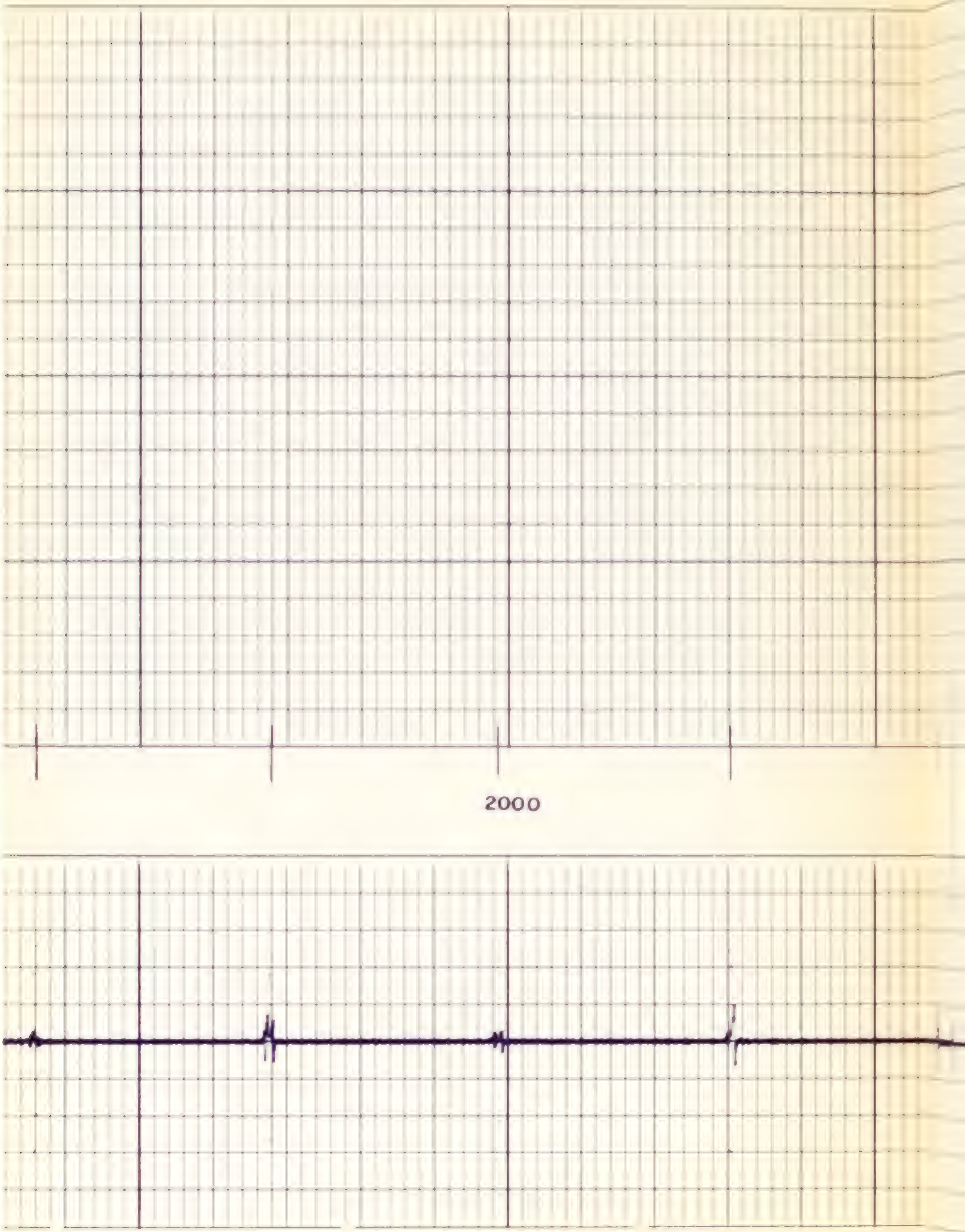


1600




1700
1800


1800
1900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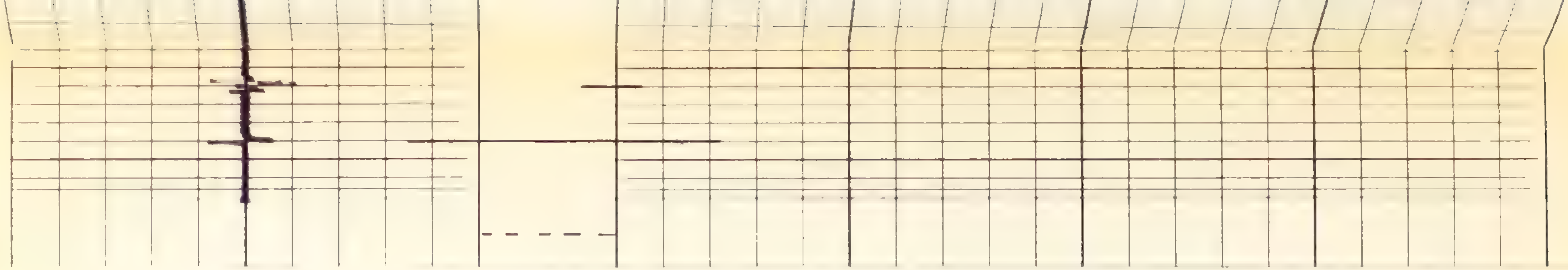
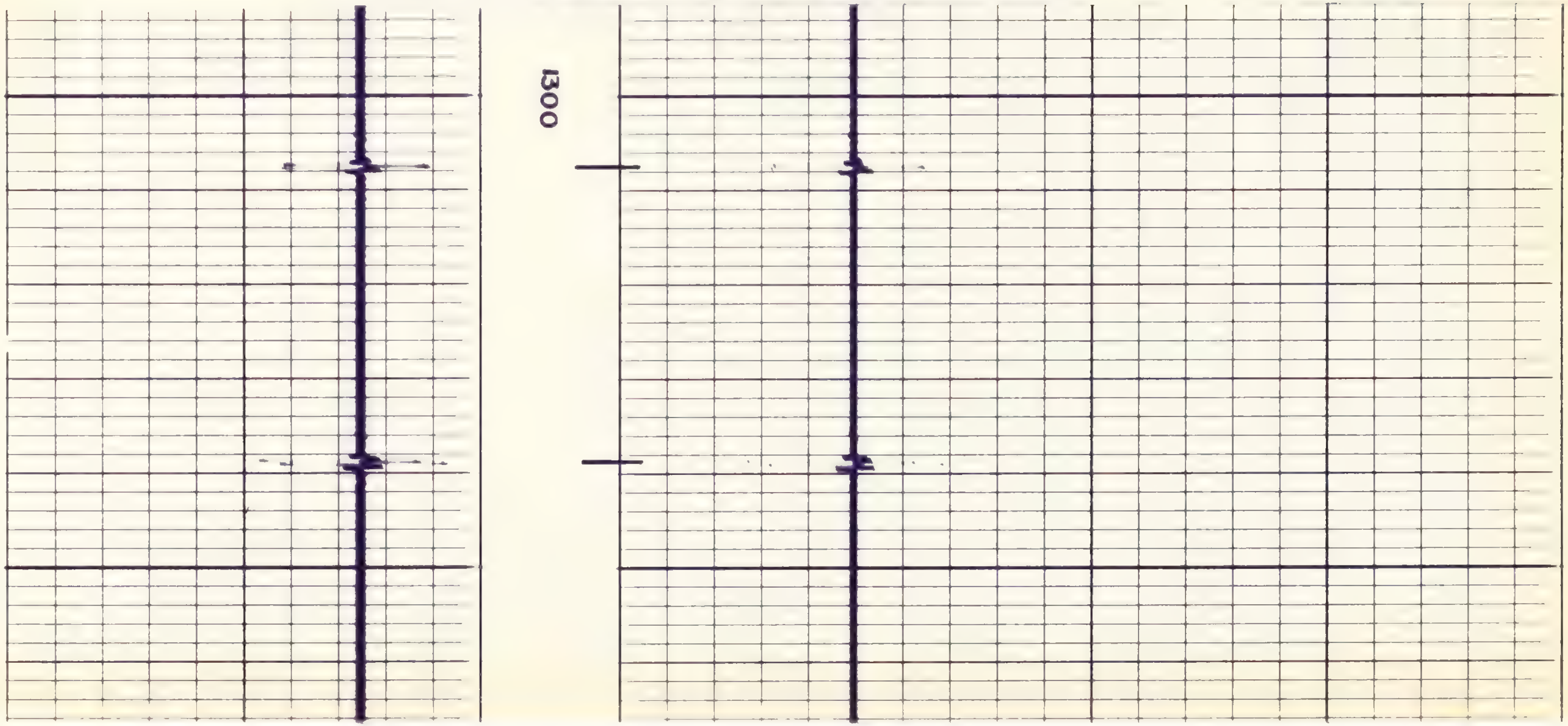
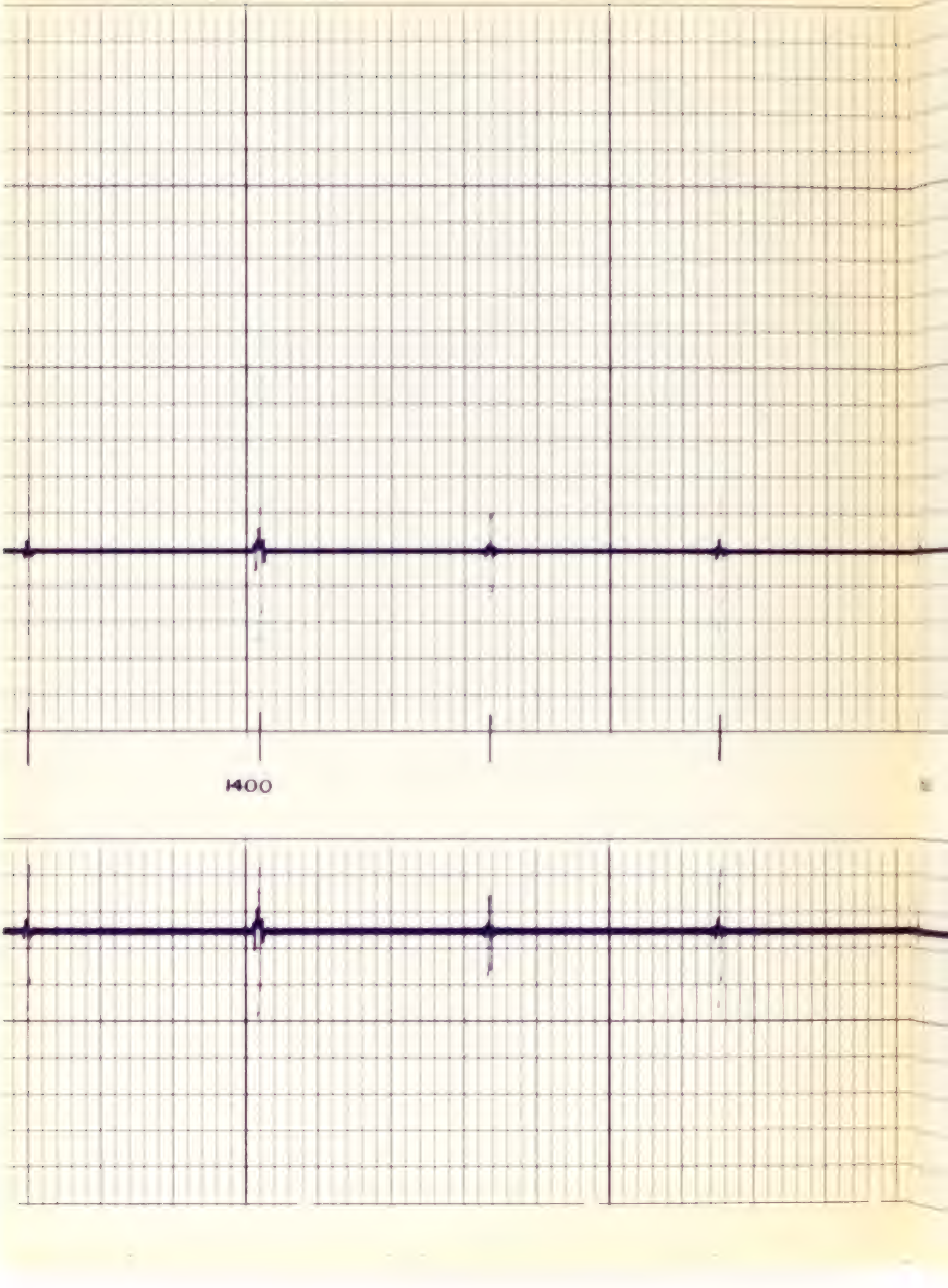


COLLAR LOG RUN AFTER PERFORATING

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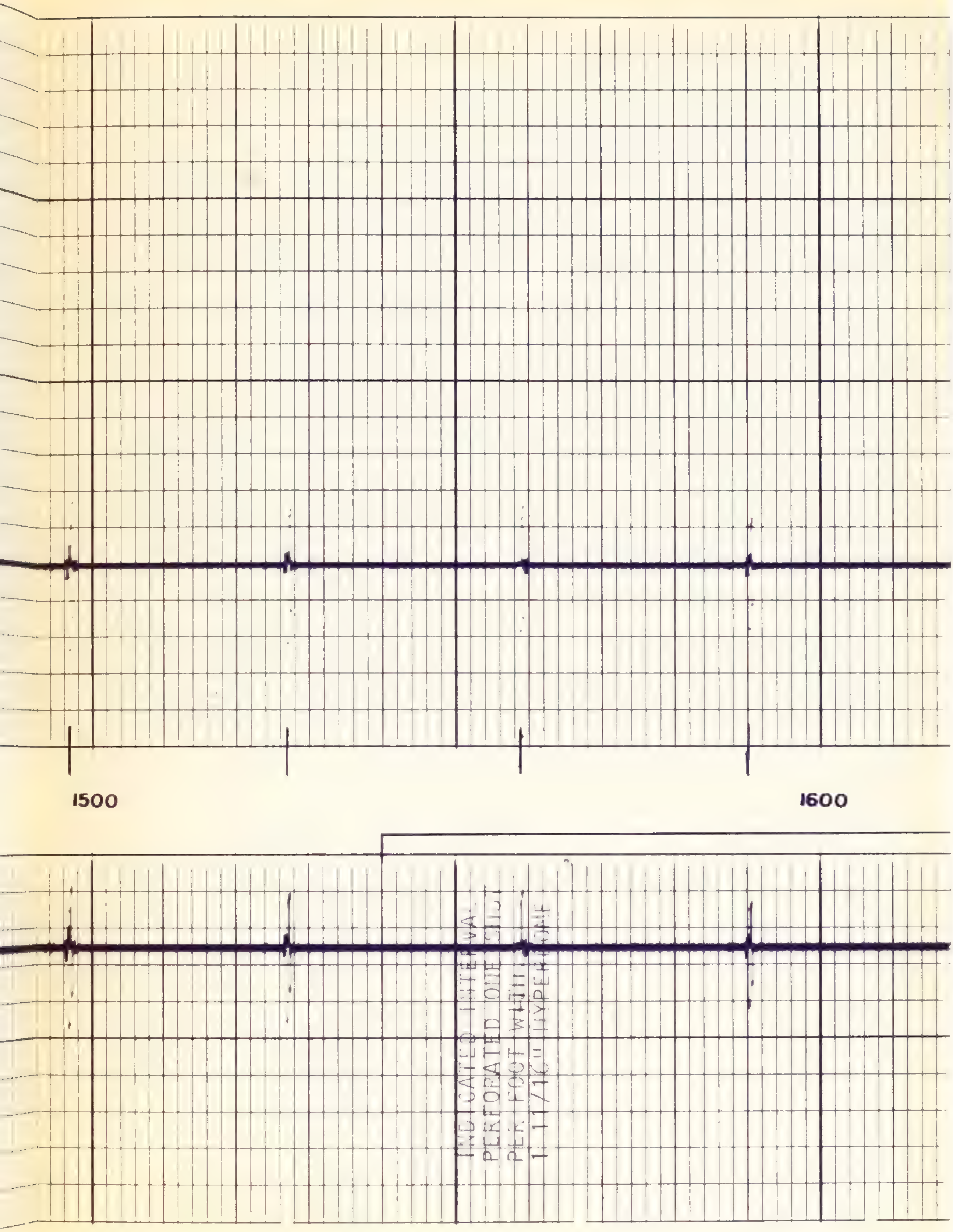
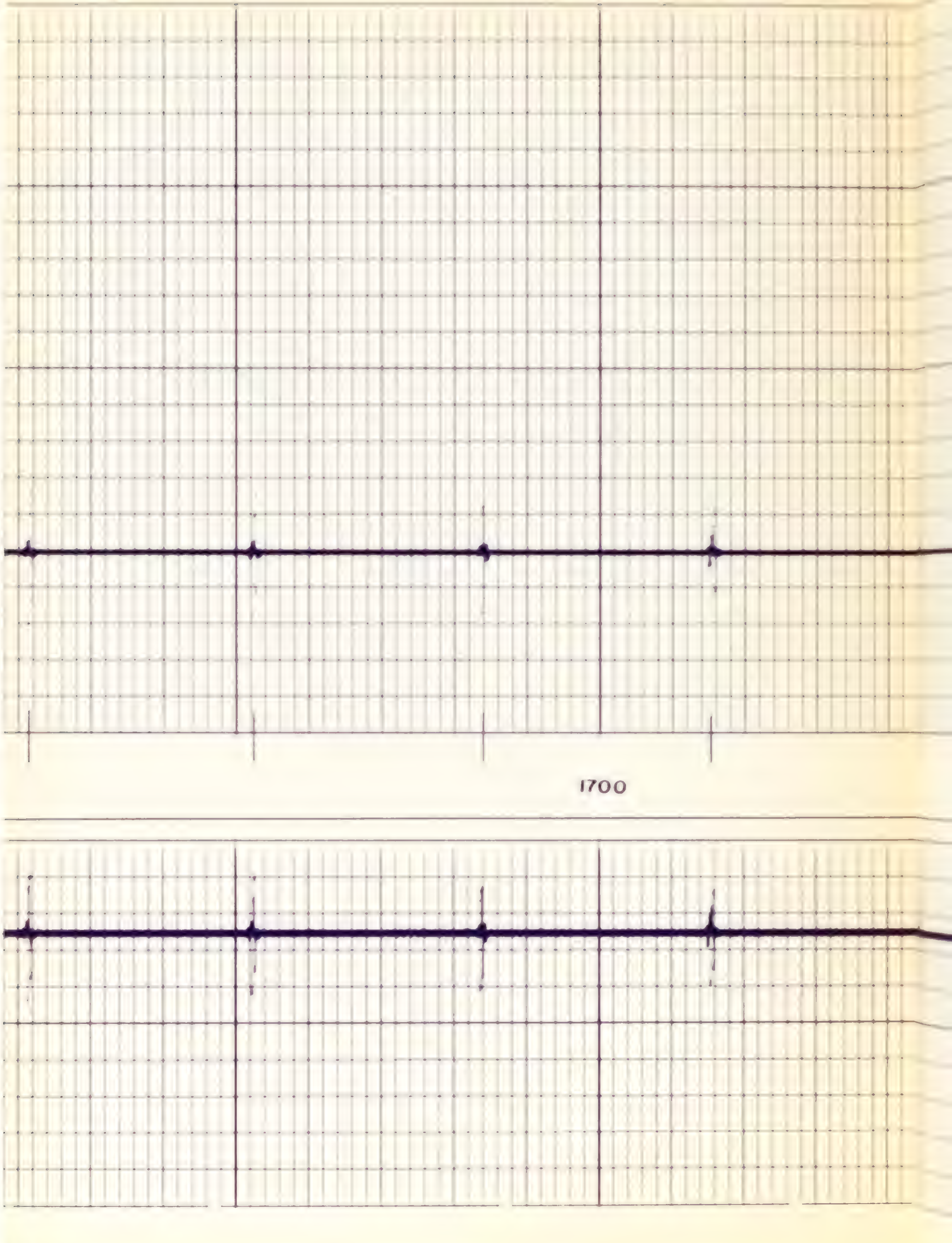

1500
1600
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME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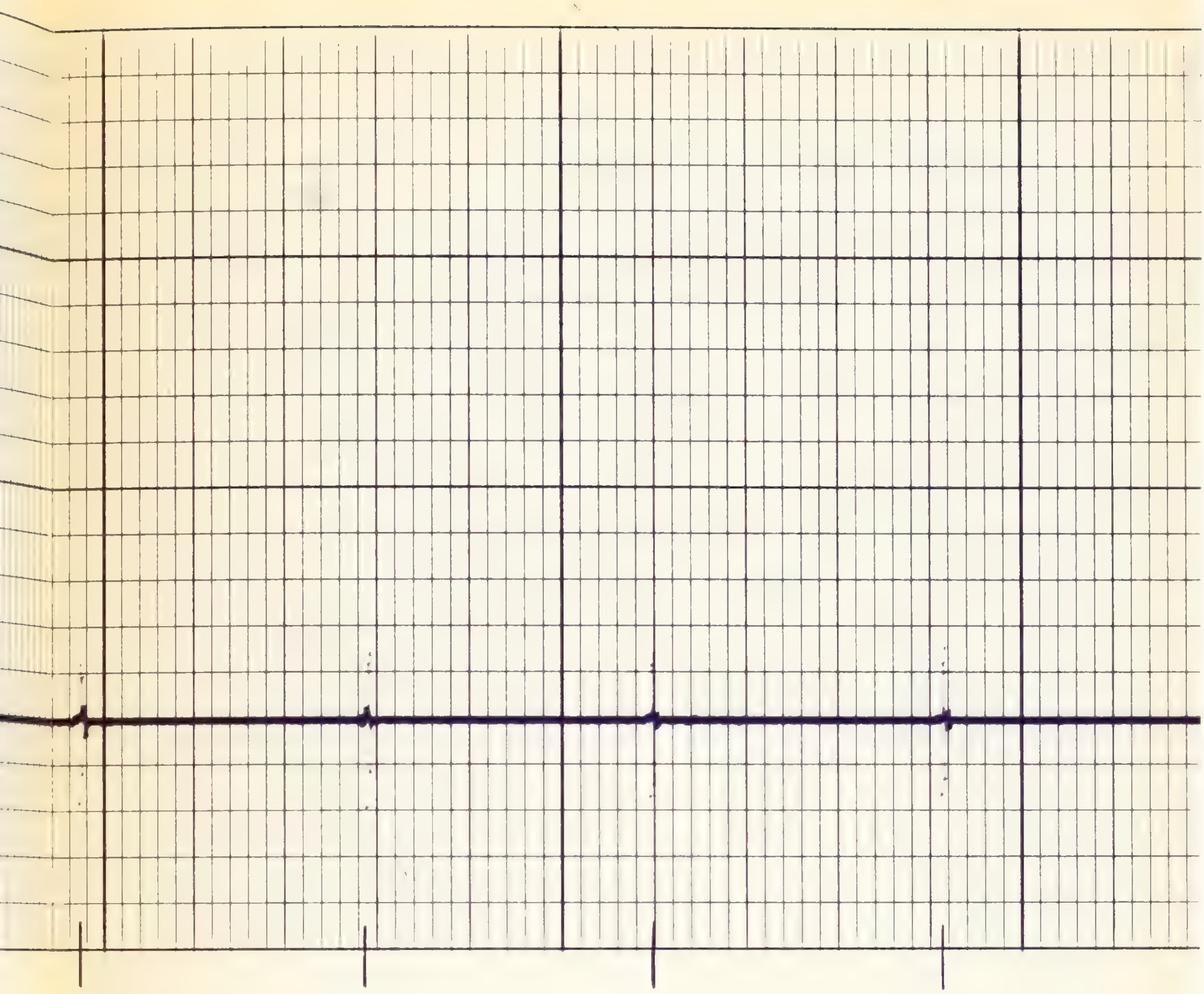

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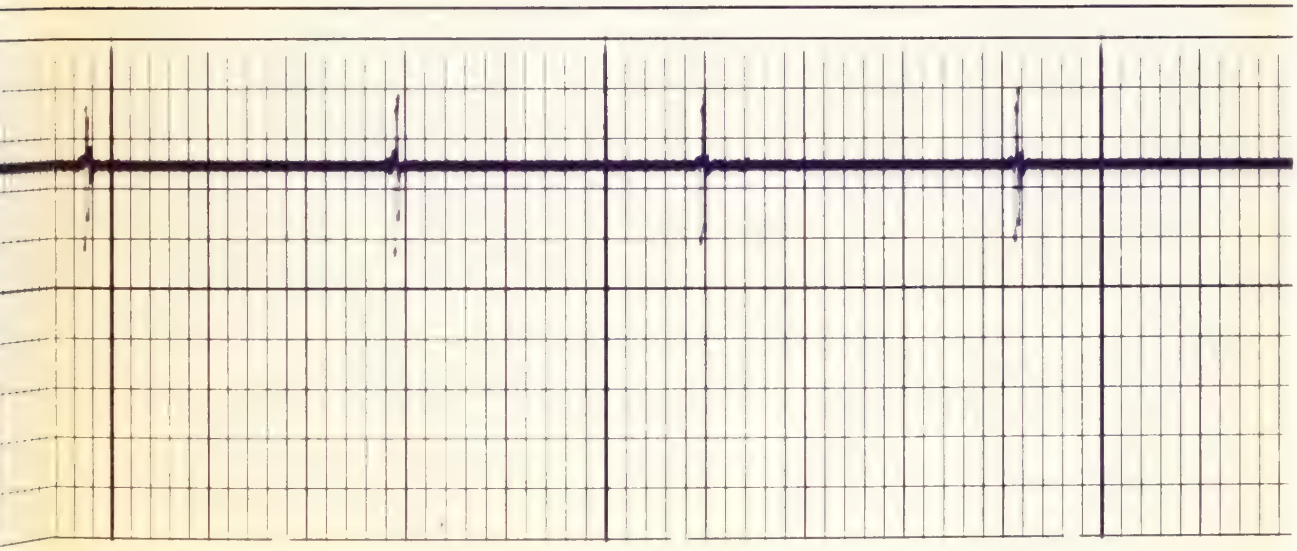
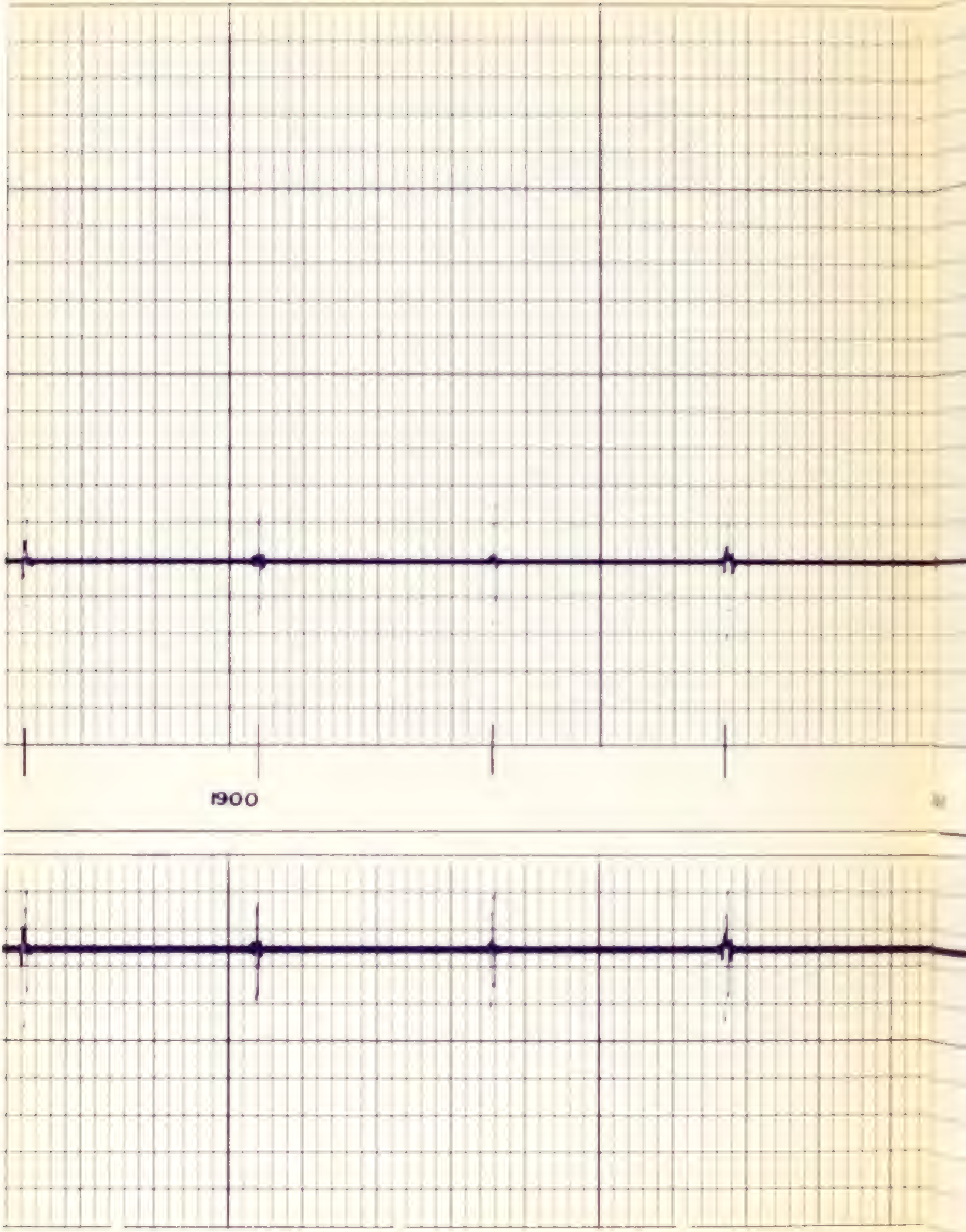



1900

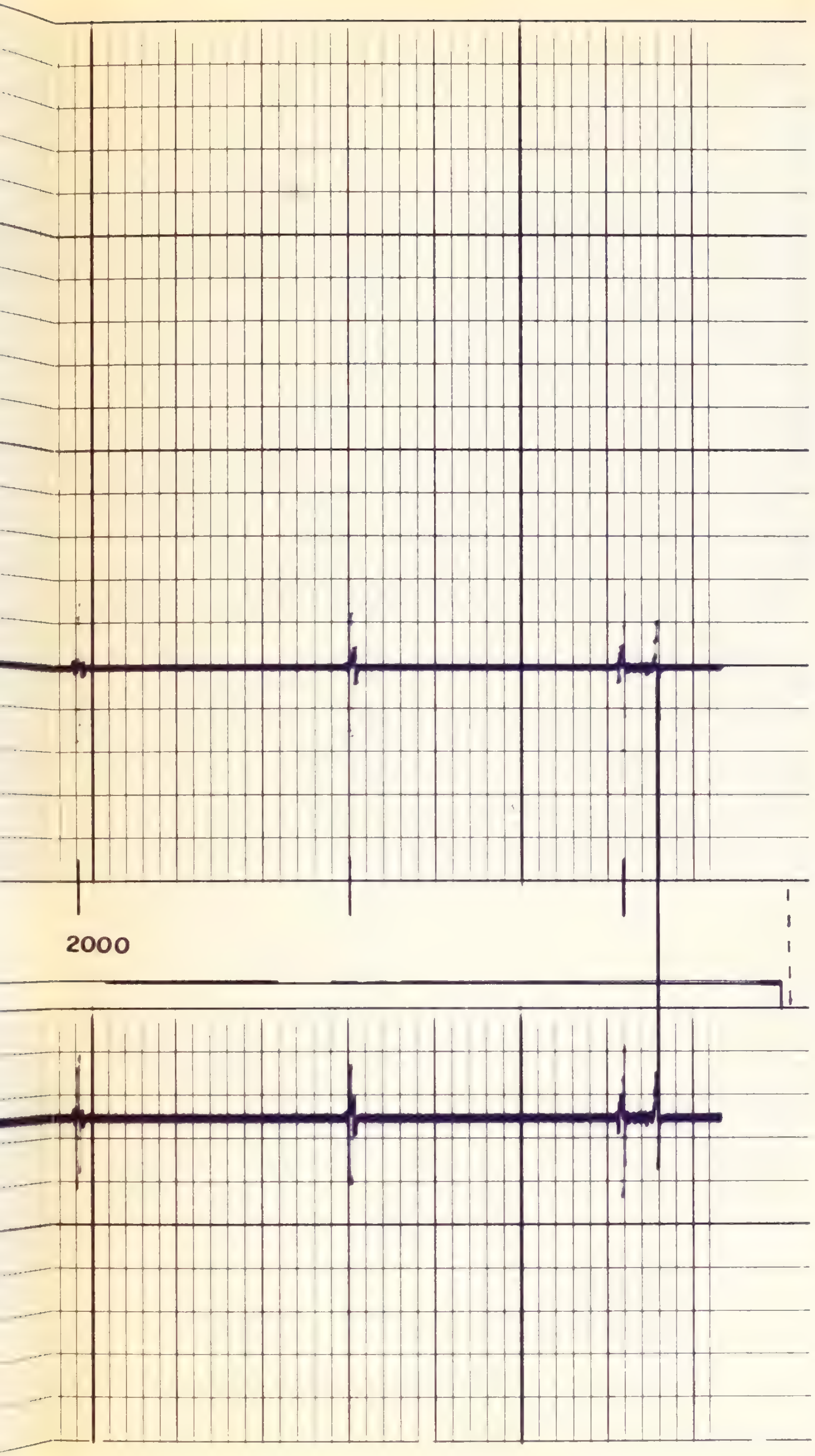
COMPANY ATLANTIC RICHFIELD COMPANY

SCHL. TD ____

DRLR TD ____

DEPTHS

CASING COLLAR LOG
AFTER PERFORATION



WELL

FIELD

COUNTY [illegible] STATE [illegible]

Elev:

KB

DF

GL [illegible]

Schlumberger

PERFORATING DEPTH CONTROL

COUNTY RIO BLANCO
FIELD or LOCATION
WELL CB-1
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-1

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location
1153' FSL & 1015' FWL
Sec. 1 Twp. 3S Rge. 97W

Other Services:
CBL-VDL-CCL
SP-HD

Permanent Datum: GROUND LEVEL ; Elev.: 6760
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6760

Date	10-16-74		
Run No.	ONE		
Type Log	GAMMA RAY		
Depth — Driller	2094		
Depth — Logger	2078-STICKY		
Bottom logged interval	2068		
Top logged interval	1000		
Type fluid in hole	WATER		
Salinity, PPM Cl.	----		
Density	----		
Level	FULL		
Max. rec. temp., deg F.	----		
Operating rig time	ONE HOUR		
Recorded By	ST. AUBYN		
Witnessed By	MR. ELLARD		

BORE-HOLE RECORD

Bit Size	From	To
4 3/4	SURF	TD

CASING RECORD

Size	Wgt.	From	To
2 3/8	4.7	SURF	2103

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

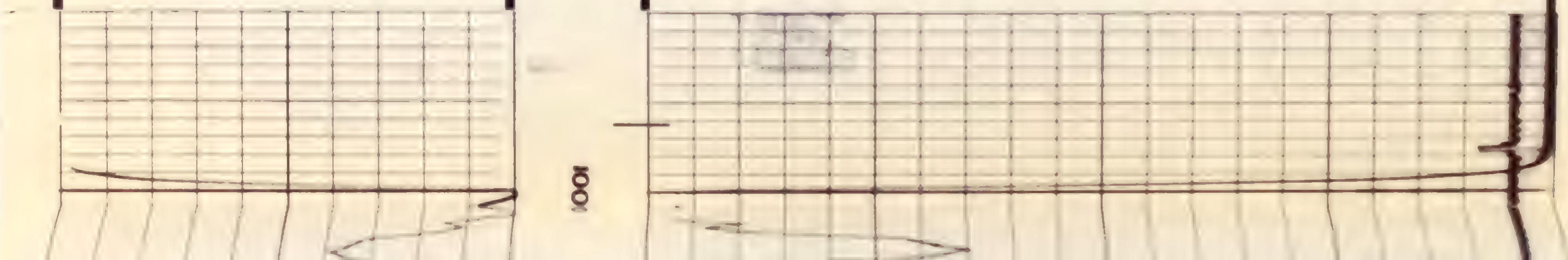
EQUIPMENT DATA

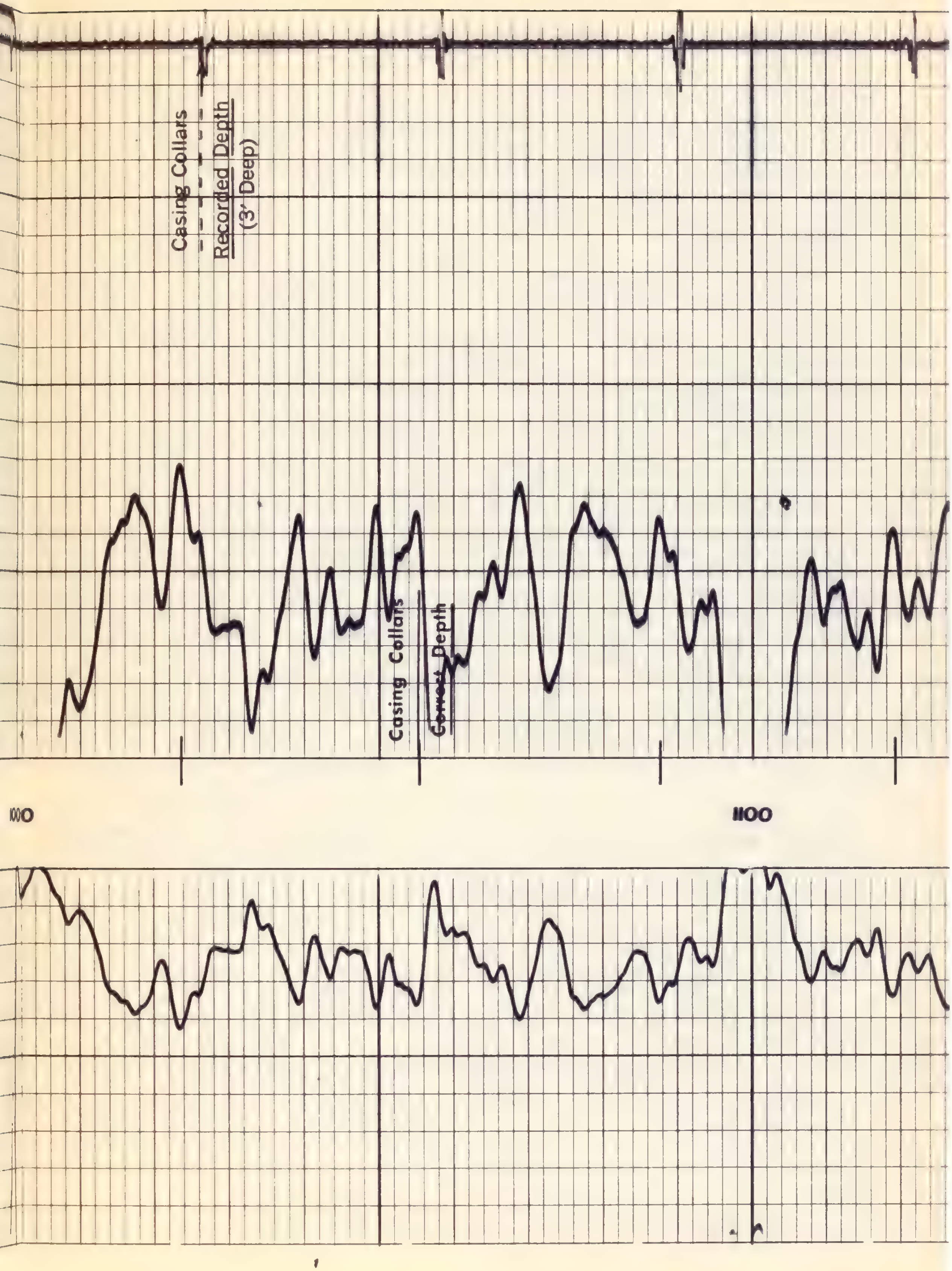
	Gamma Ray
Run No.	ONE
Tool Model No.	GNT-K
Diameter	1 11/16"
Det'r Model No.	SGD-H
Type	SCINT
Length	8"
S. O. No.	49323
	General
Hoist Truck No.	3862
Inst. Truck No.	3862
Tool Serial No.	18
Location	VERNAL

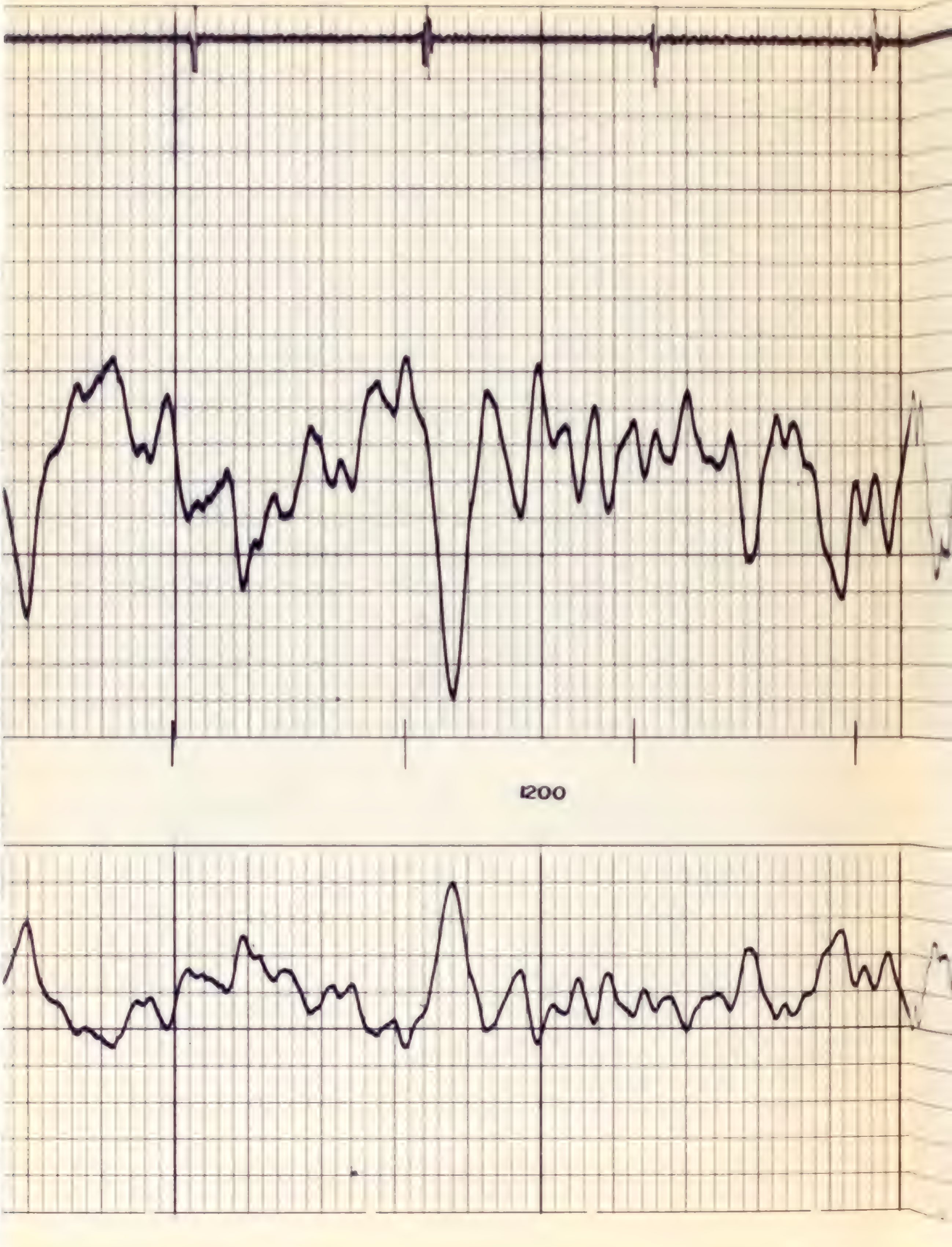
Remarks: Casing Collars recorded 3 ft. DEEP. Corrected collar depths are shown in the depth track.

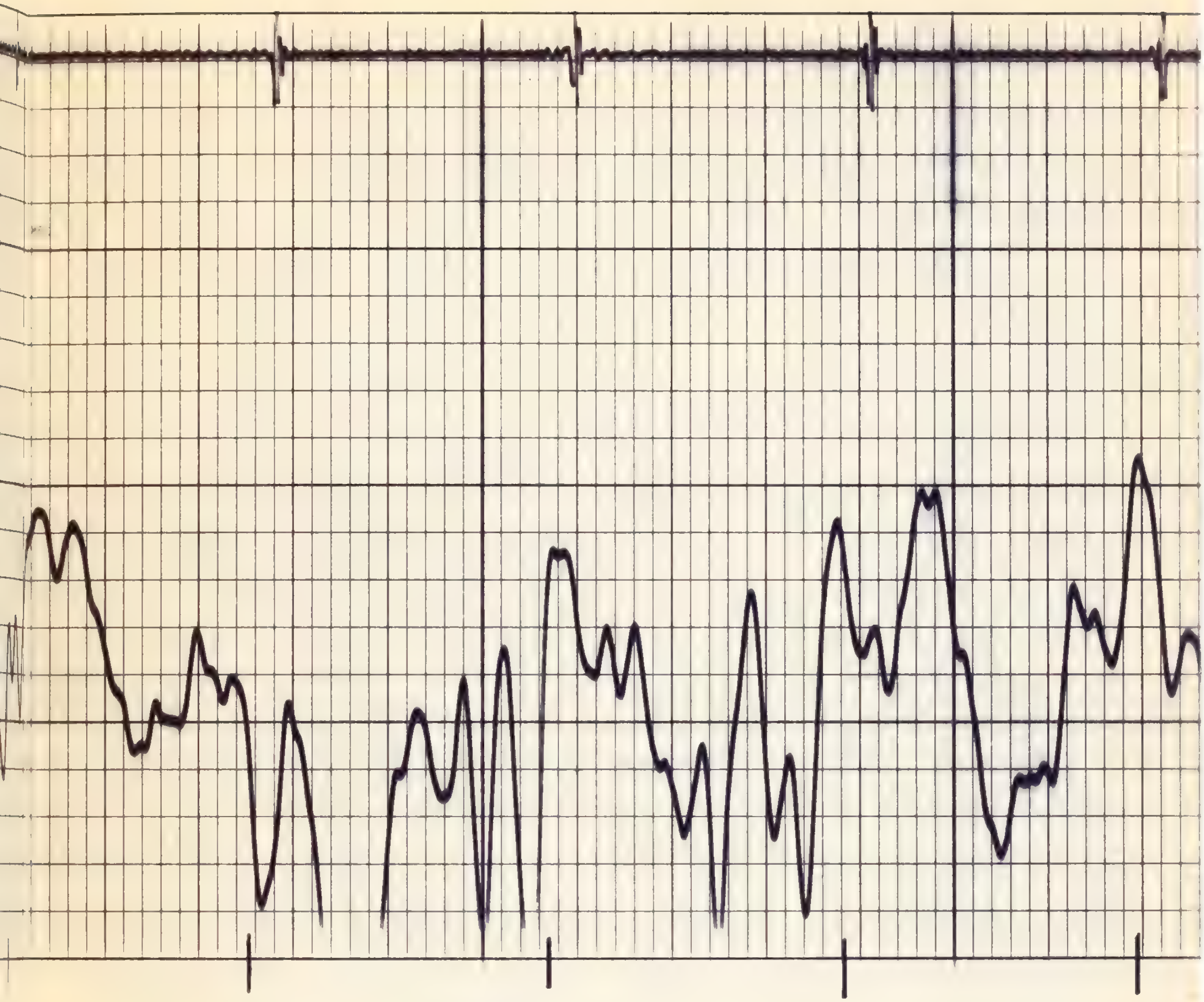
FIRST JOINT OF TUBING @ SURFACE IS BENT-HAS TROUBLE GETTING IN HOLE-ALSO STOPPED AT 1832-FINALLY GOT TO BOTTOM OKAY-BOTTOM STICKY

GAMMA RAY RADIOACTIVITY INCREASES →	DEPTHS	GAMMA RAY ← RADIOACTIVITY INCREASES
		Casing Collars Correct Depth ↓ — Recorded Casing Collars ↓

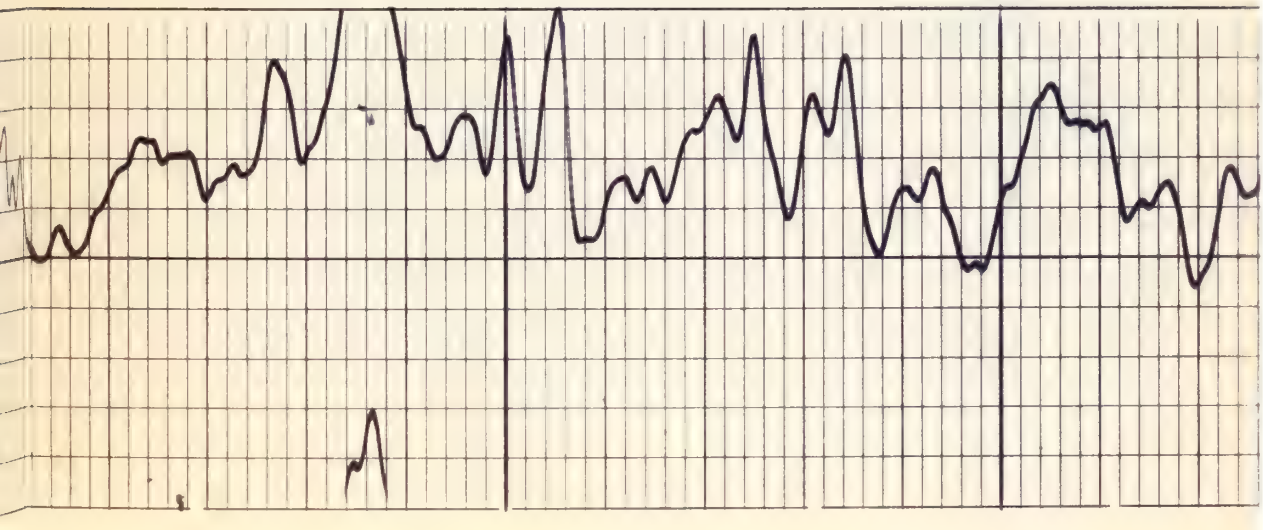


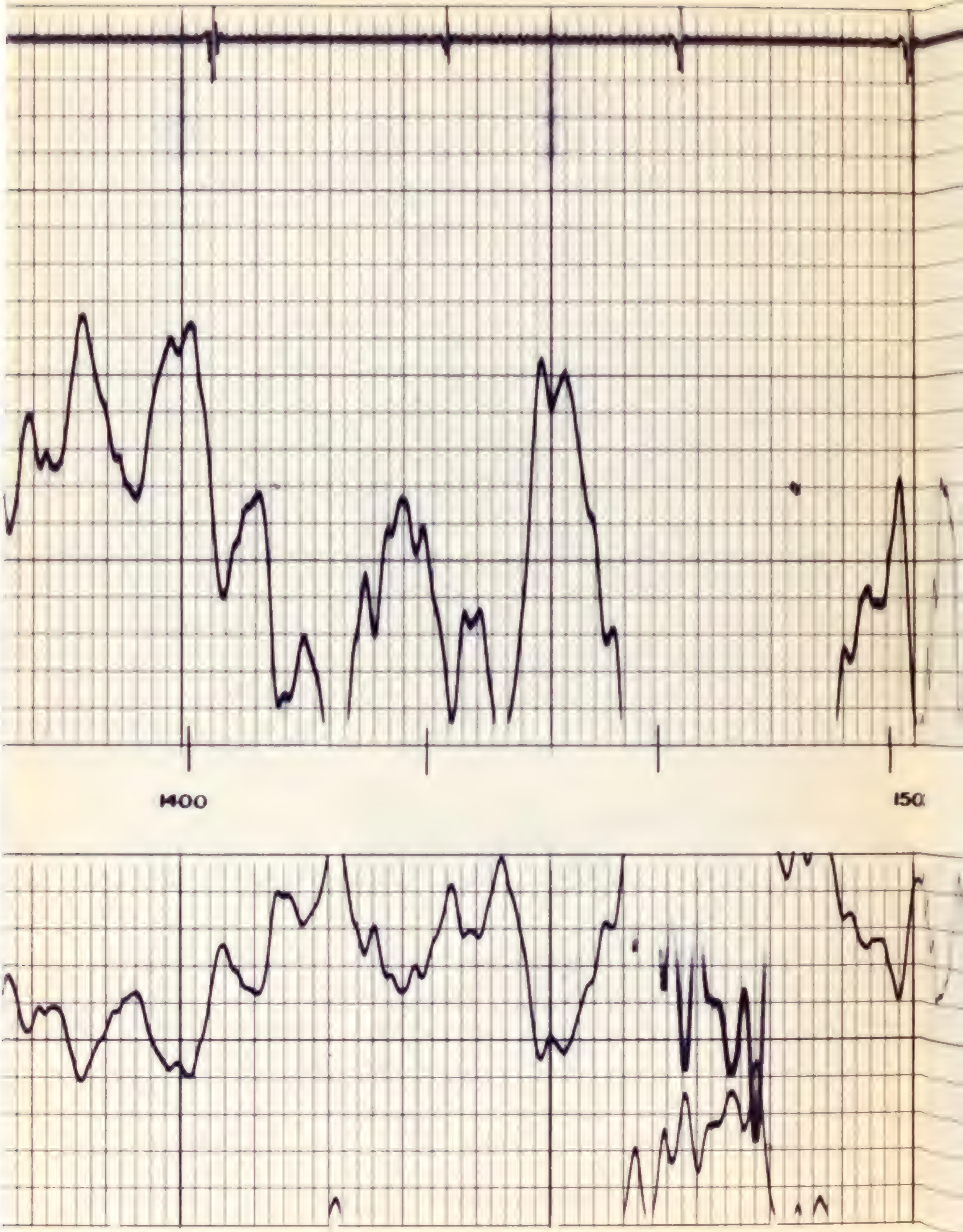

Casing Collars
Recorded Depth
(3' Deep)
Casing Collars
Correct Depth
1000
1100

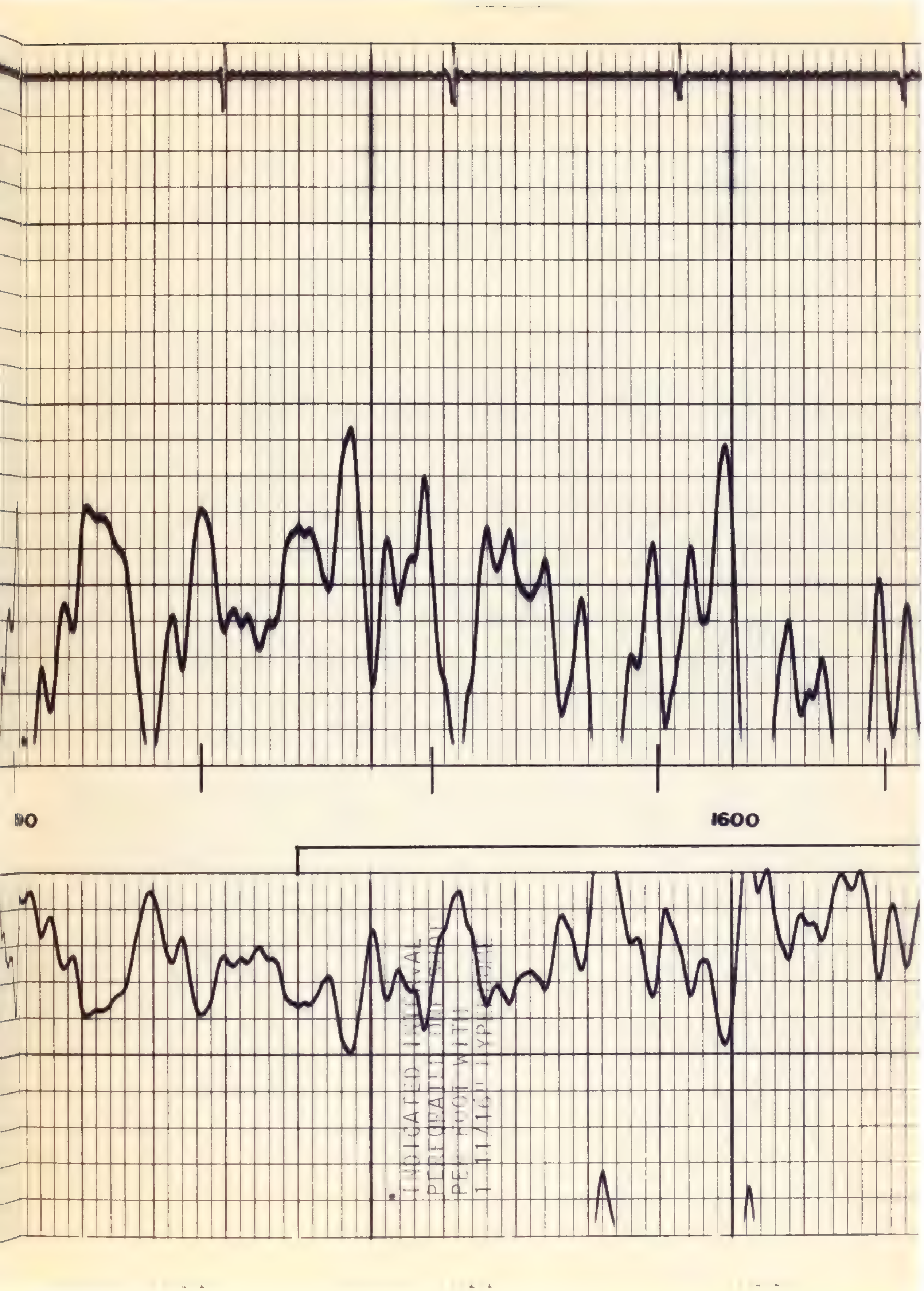

1200

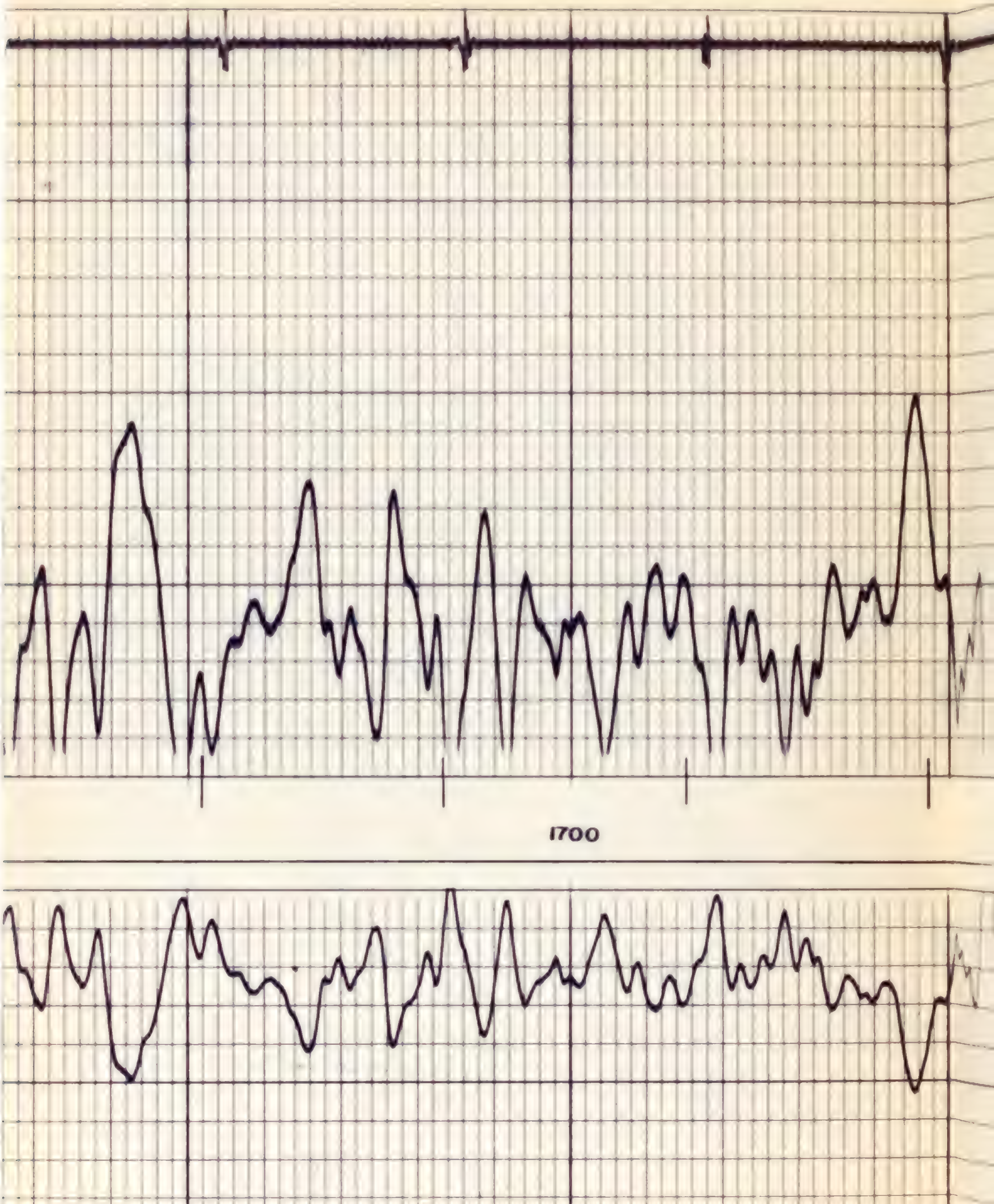


1300




1400
150


00
1600
INDICATED INTERVAL
PERFORATED ON
PER FOOT WITH
1 11/16 TYPE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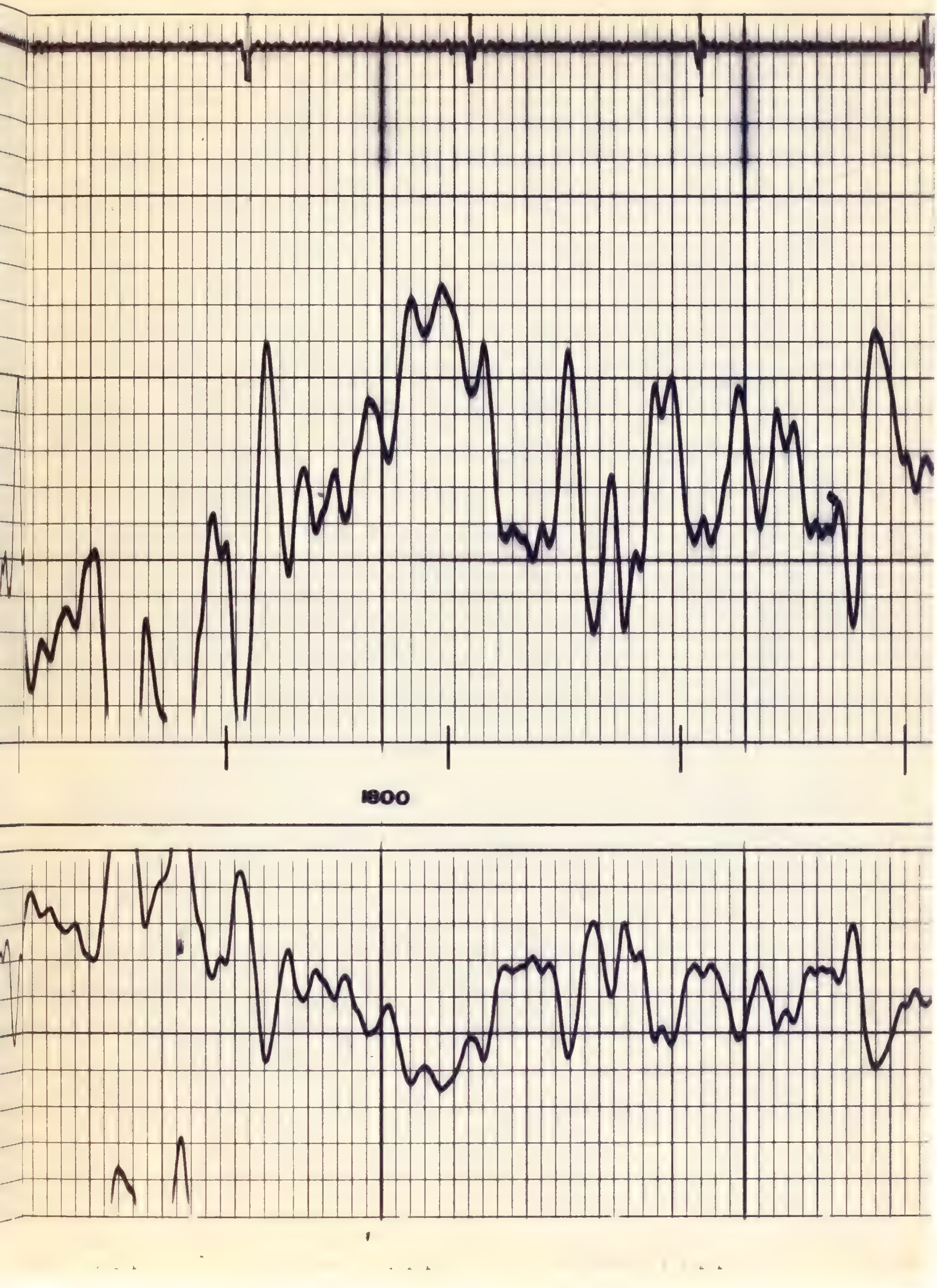

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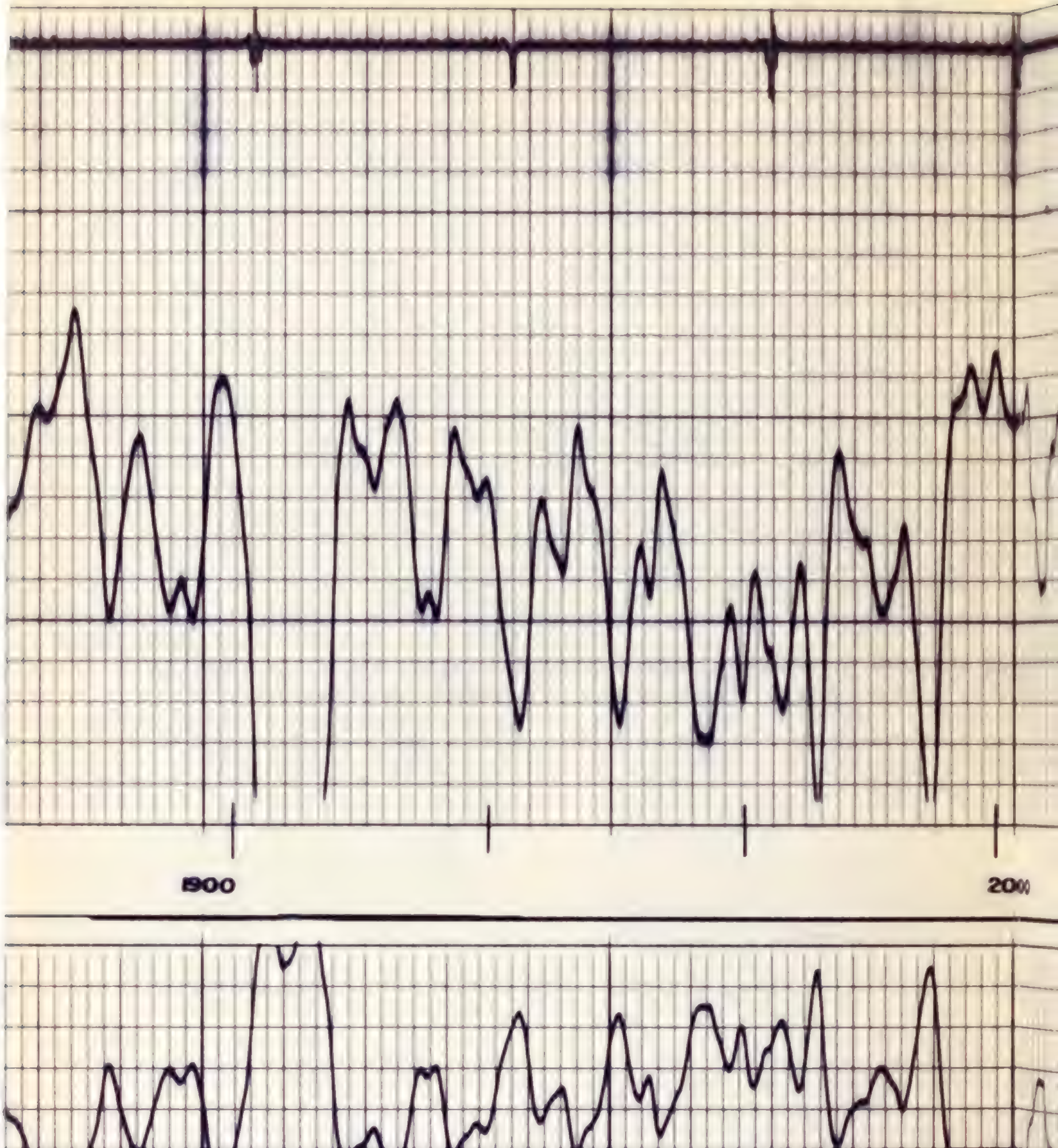
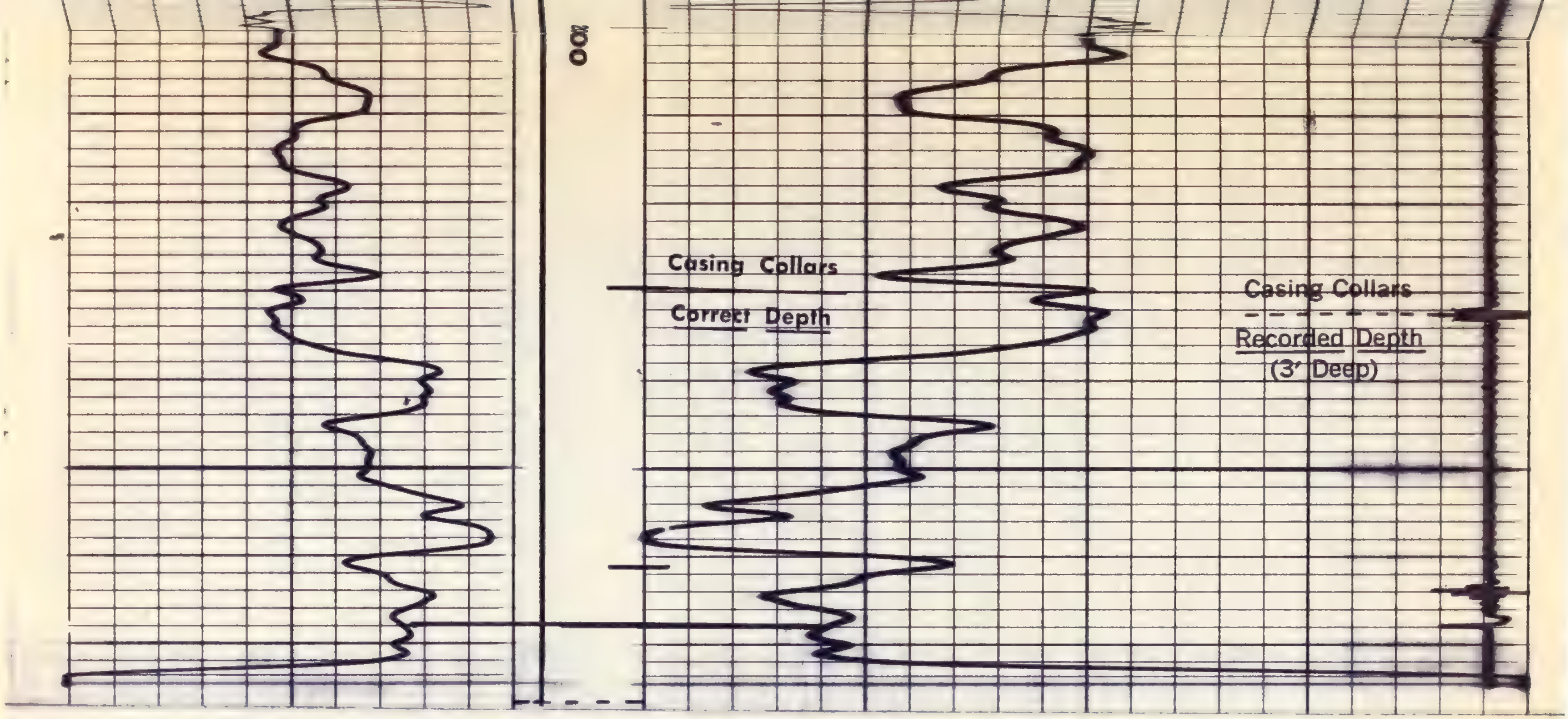

1900
2000



		↑ Casing Collars Correct Depth	Recorded ↑ Casing Collars
GAMMA RAY RADIOACTIVITY INCREASES →	DEPTHS		**GAMMA RAY** RADIOACTIVITY INCREASES ←

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CE-1

SCHL. FR 2068

SCHL. TD 2076

DRLR. TD 2094

FIELD

COUNTY RIO BLANCO STATE COLORADO

Schlumberger

CEMENT BOND LOG

VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION
WELL CB-2
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-2

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION 1589' FSL & 1300' FEL
API Serial No.

Sec. 6 Twp. 3S Rge. 96W

Other Services:
PDC-GR
SPH

Permanent Datum: GROUND LEVEL, Elev.
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6737

Date	10-14-74	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	1454	Max. Rec. Temp.	---- °F
Depth — Logger	1441	Est. Cement Top	1146
Btm. Log Interval	1431	Equip. | Location	3362 | VERNAL
Top Log Interval	1000	Recorded By	ST. AUBYN
Open Hole Size	4 3/4	Witnessed By	MR. ELLARD

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String						
Prot. String						
Prod. String	2 3/8	4.7		T-C	SURF	1460
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			50 SKS.	
Type of cement			CLASS "G"	
Additive			2% CACL.	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

PRIMARY CEMENTING PROCEDURE

	Hour – date	Hours from start of operation
Started pumping cement	14:00 9-16-74	
Release pressure	15:00 3-16-74	
Start Cement Bond Log	22:00 10-14-74	
Finish Cement Bond Log	1[illegible]:00 10-14-74	

REMARKS
Service Order No. [illegible]
Csg. Collars Recorded [illegible] ft. [illegible]

Preceding fluid ______ Volume ______ bbls.
Cement pumped ______ bbls./minute
Pipe reciprocated during Pumping: Yes ______ No ______
Pipe reciprocated after plug down: Yes ______ min., No ______

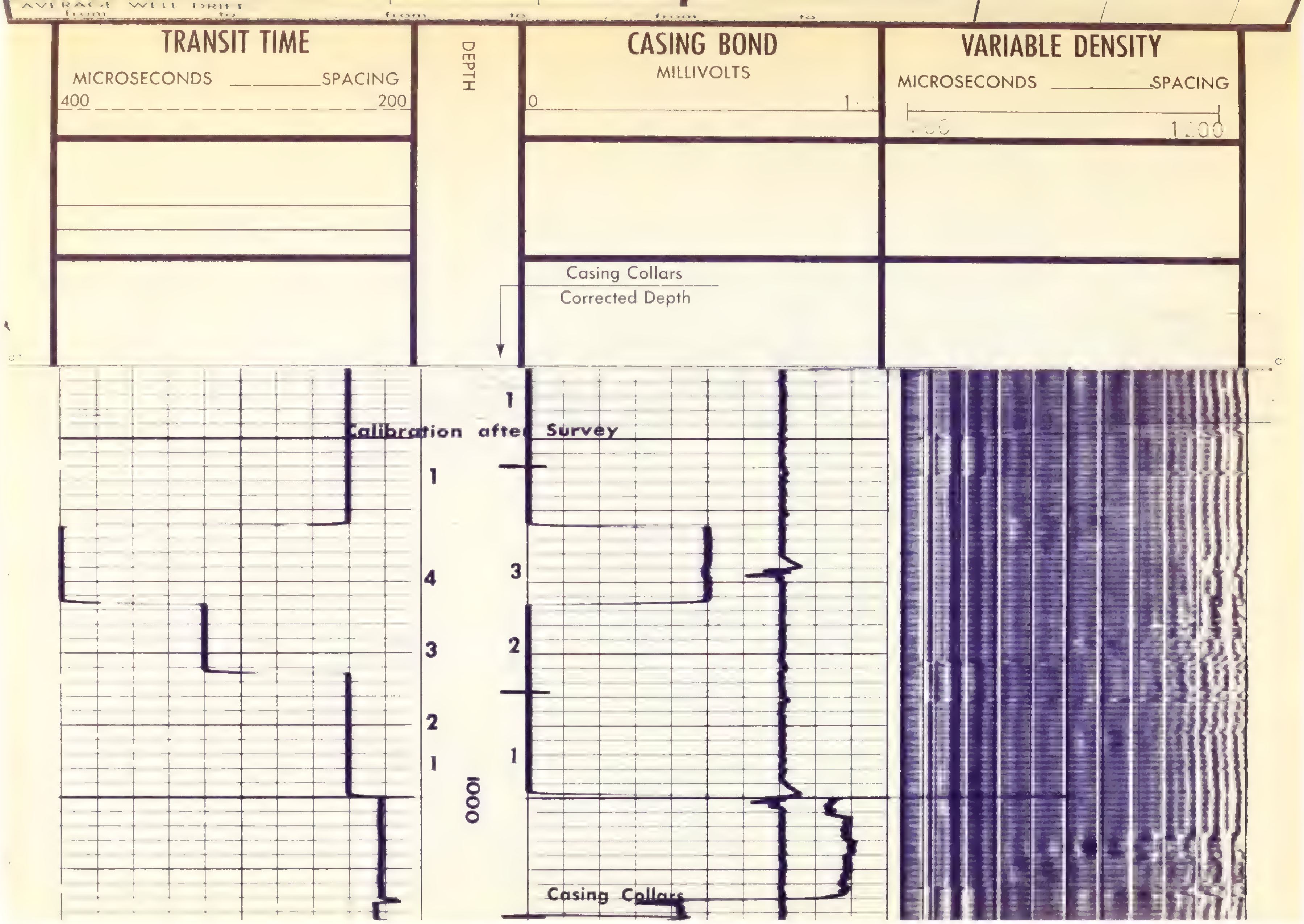
SQUEEZE JOB DETAIL

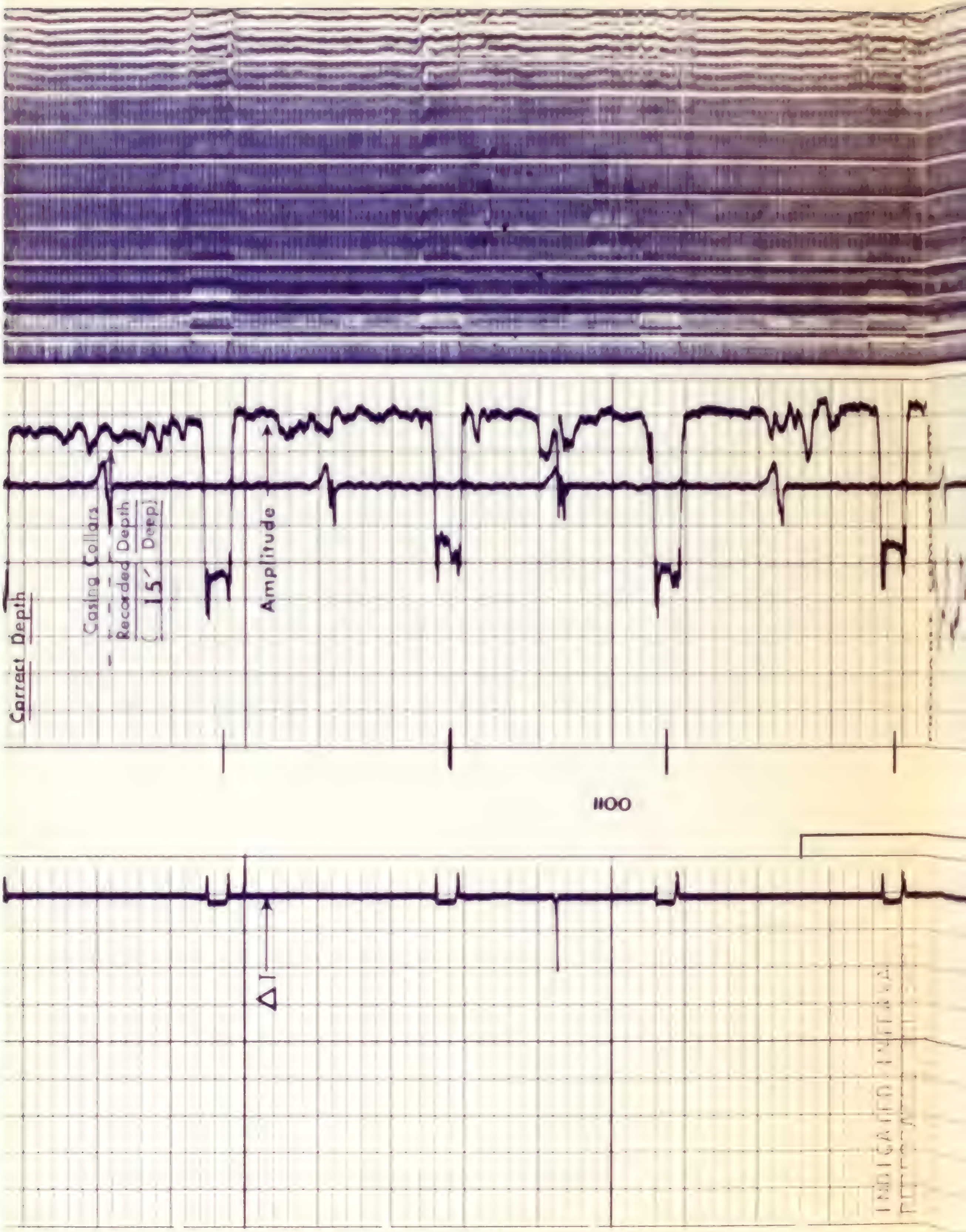
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

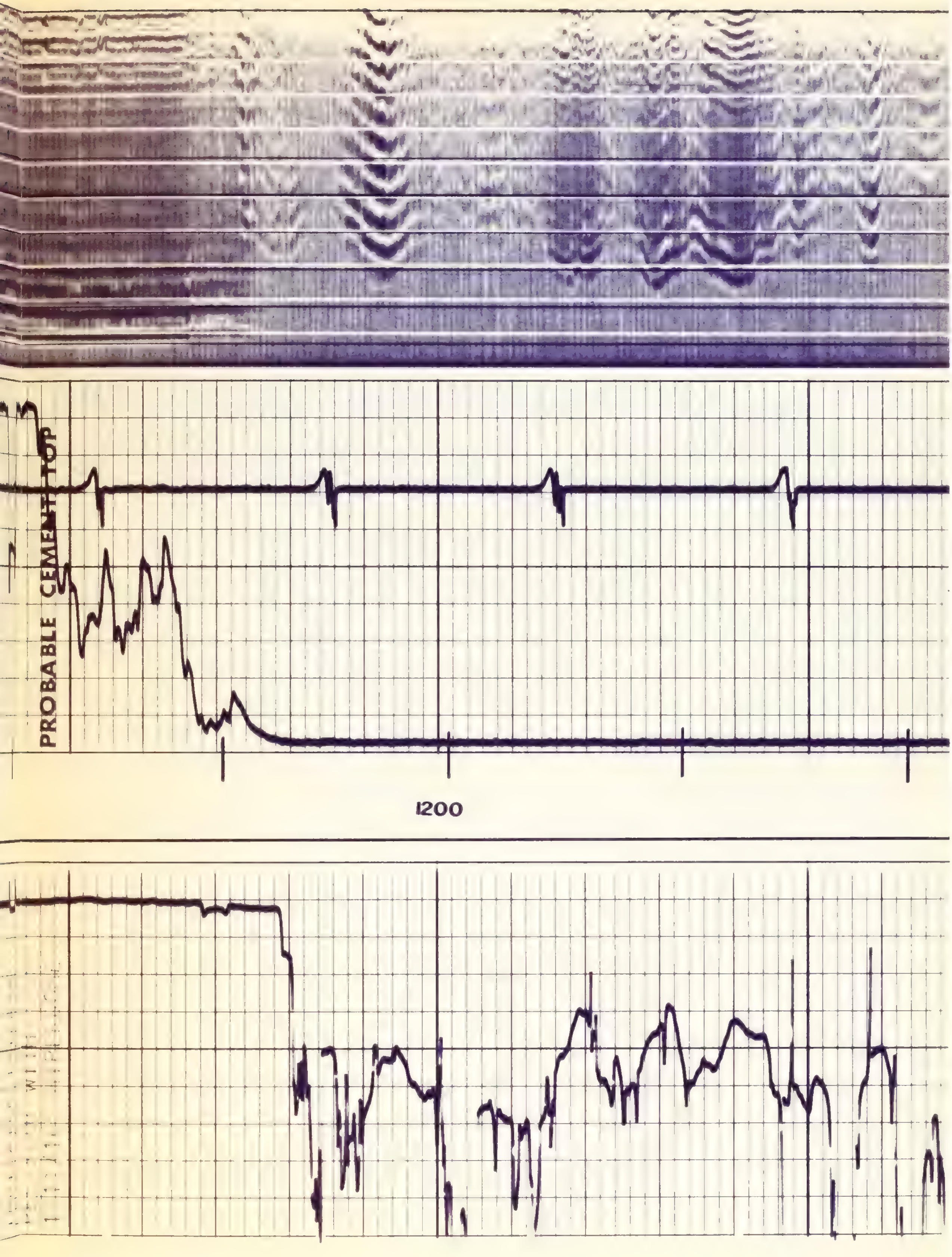
AVERAGE WELL DRIFT:
from ______ to ______ ; from ______ to ______ ; from ______ to ______

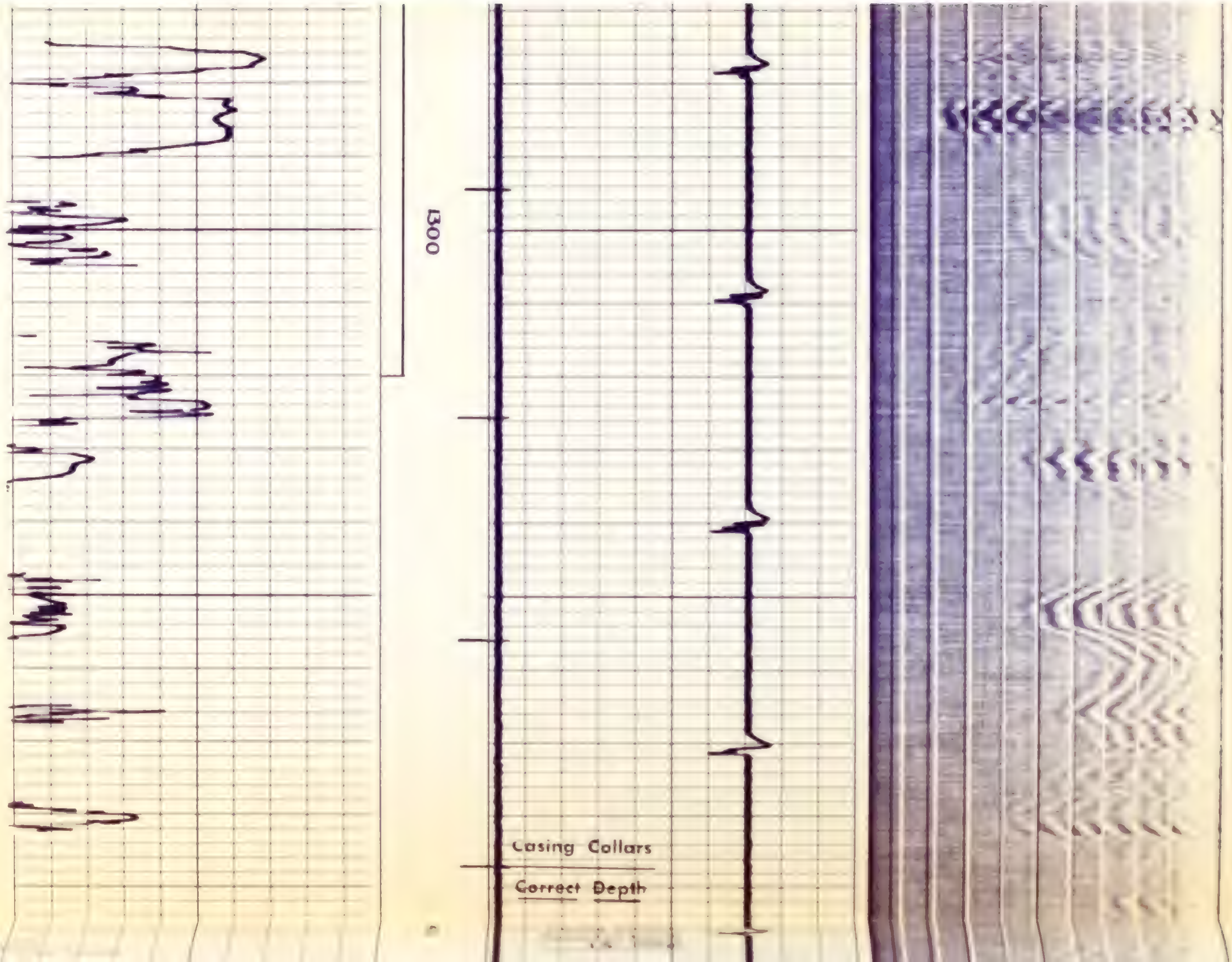
EQUIPMENT DATA

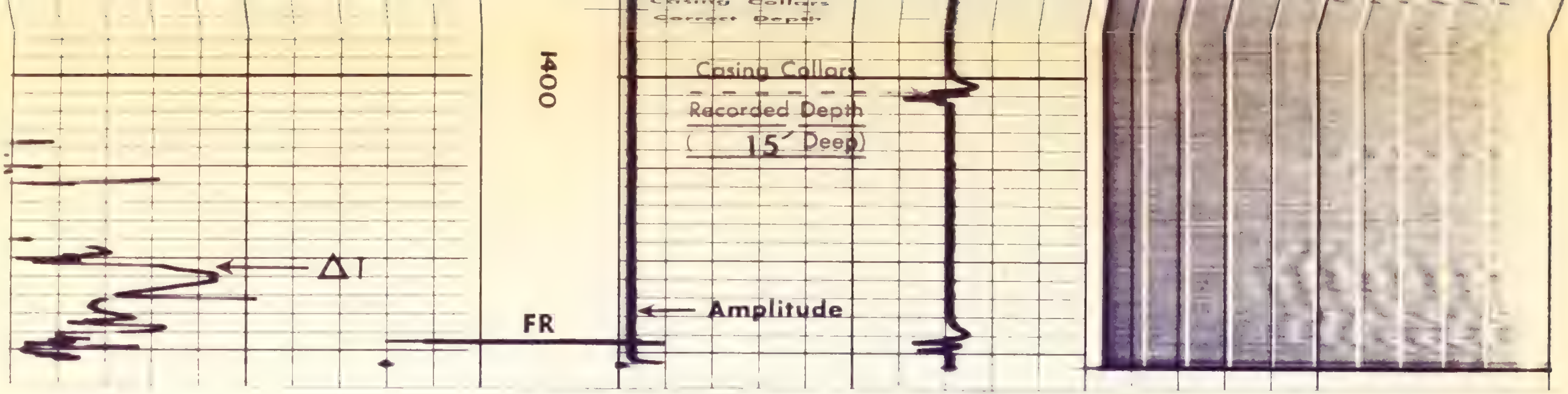
EQUIPMENT DATA		Centralizer Depths	Scratcher Depths
Sonic Panel No.	[illegible]		
Sonic Cart No.	[illegible]		
Sonic Sonde No.	[illegible]		
CRP No.			
Mem Panel No.	---		
GR Panel No.	--		
GR Cart No.			
Centralizer: Type	[illegible]		
No.	[illegible]		
To Level (MV)	[illegible]		
Cart. Gain	[illegible]		
CRP Intensity	[illegible]		
R9G Intensity			
Logging Speed	30 FPM		
Time Constant			

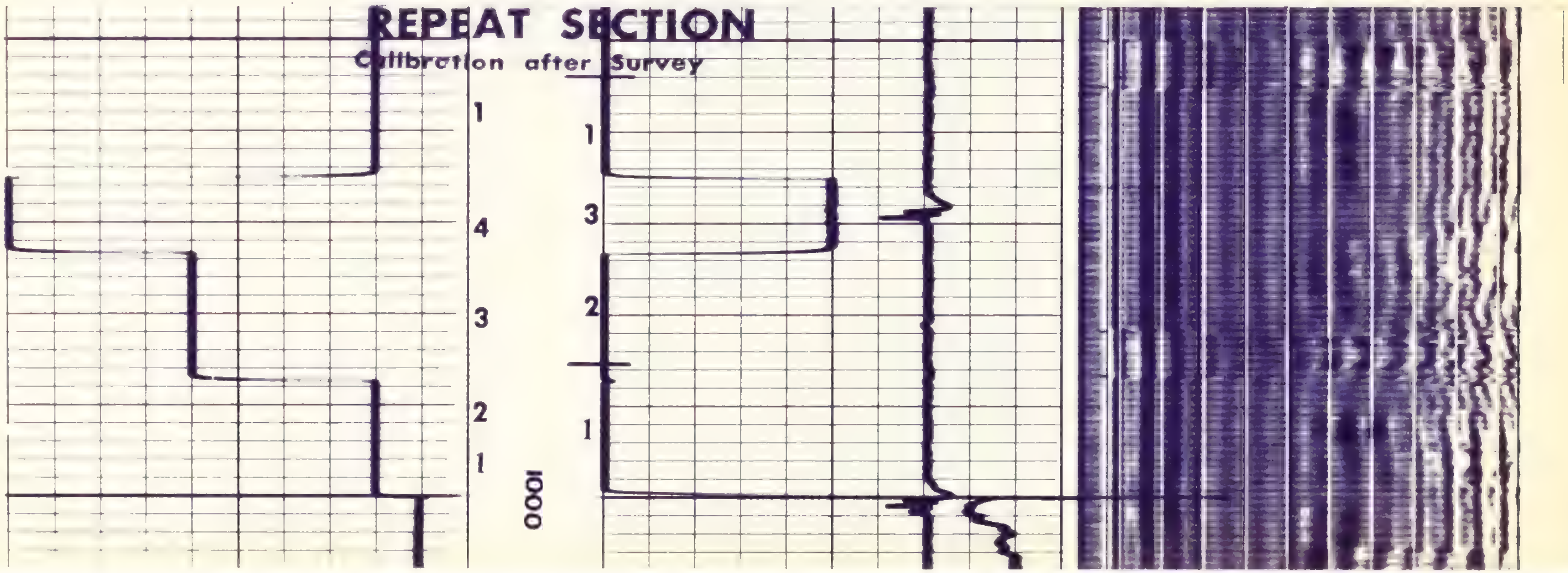

AVERAGE WELL DRIFT
from
to
from
to
from
to
TRANSIT TIME
MICROSECONDS
SPACING
400
200
DEPTH
CASING BOND
MILLIVOLTS
0
Casing Collars
Corrected Depth
VARIABLE DENSITY
MICROSECONDS
SPACING
200
1200
1
Calibration after Survey
1
4
3
3
2
2
1
1
1000
Casing Collars

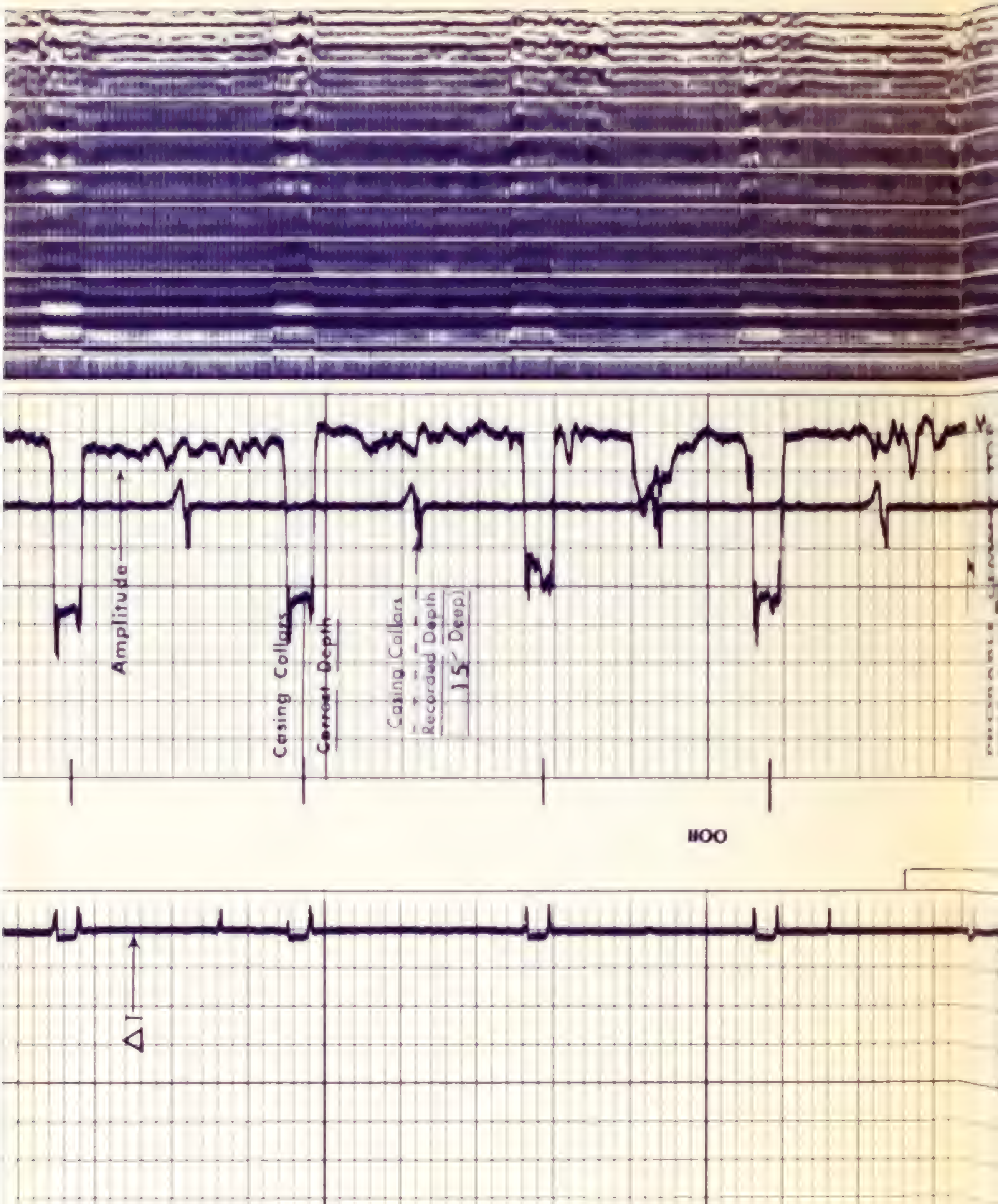

Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
1100
ΔT
INDICATED INTERVAL

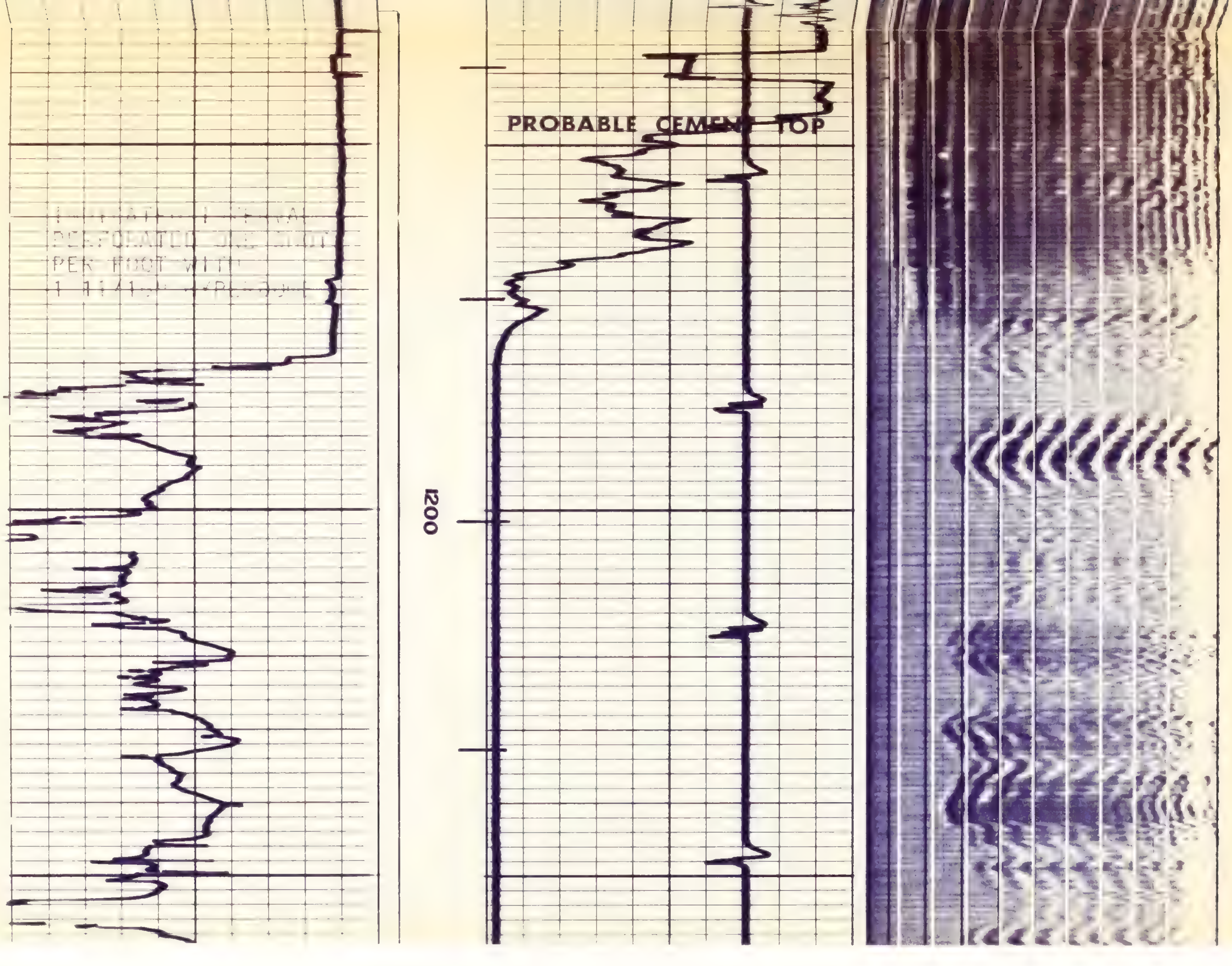

PROBABLE CEMENT TOP
1200

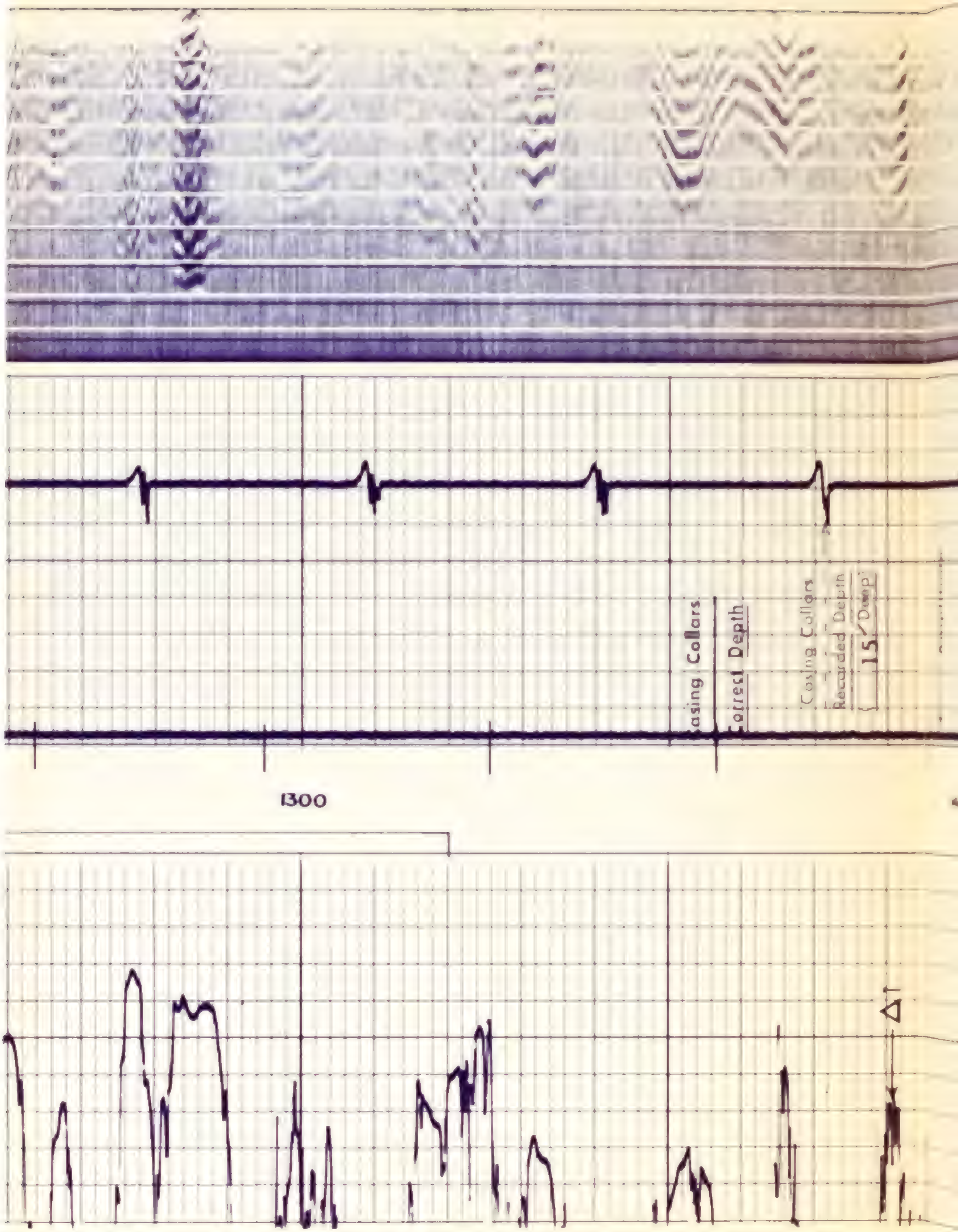

1300
Casing Collars
Correct Depth

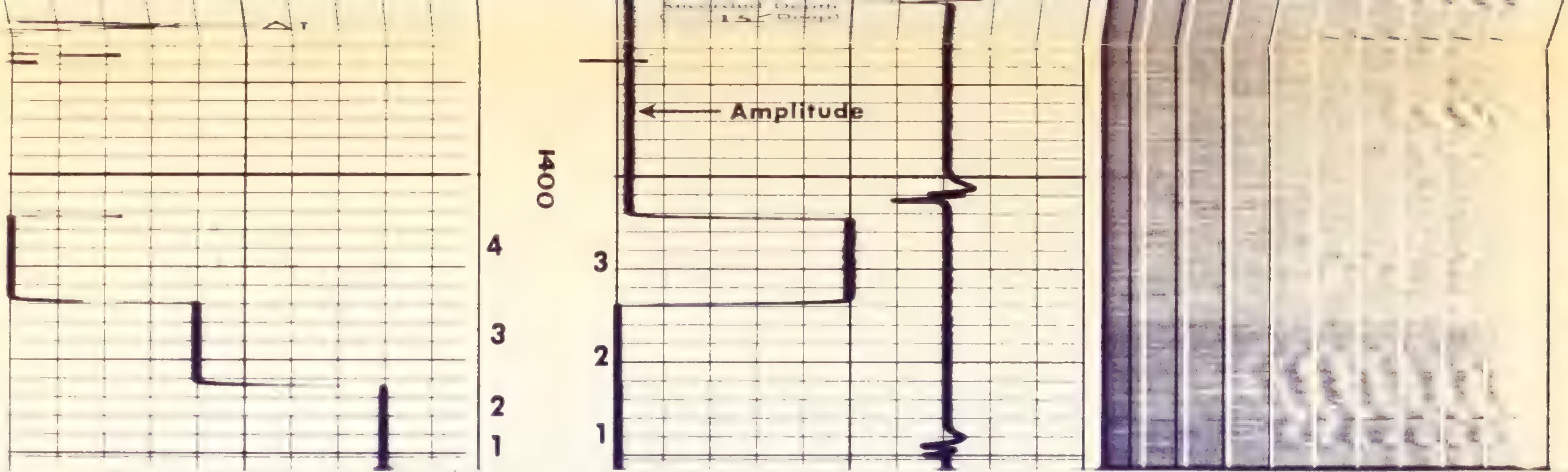

Casing Collars
Correct Depth
1400
Casing Collars
Recorded Depth
(15′ Deep)
ΔT
FR
Amplitude


REPEAT SECTION
Calibration after Survey
1
4
3
2
1
1
3
2
1
1000


Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
1100
ΔT


PROBABLE CEMENT TOP
1200
PERFORATED ONE SHOT
PER FOOT WITH


asing Collars
Correct Depth
Casing Collars
Recorded Depth
15' Damp
1300
ΔT



Casing Collars
Corrected Depth

TRANSIT TIME	DEPTH	CASING BOND	VARIABLE DENSITY
MICROSECONDS ______ SPACING 400 ------ 200		MILLIVOLTS 0 ------ 100	MICROSECONDS ______ SPACING 200 ------ 1200

COMPANY ATLANTIC RICHFIELD COMPANY
WELL [illegible]-1
FIELD
COUNTY RIO GRANDE STATE COLORADO

SCHL. FR 1431
SCHL. TD 1441
DRLR TD 1454
Elev:
KB ----
DF ----
GL [illegible]

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1	MECHANICAL ZERO	MECHANICAL ZERO
2	240 μ sec	ELECTRICAL ZERO
3	320 μ sec	CALIBRATE
4	400 μ sec	

Schlumberger

CASING COLLAR LOG AND PERFORATING RECORD

COUNTY RIO BLANCO
FIELD or LOCATION
WELL CB-2
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-2

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location:
1589' FSL & 1300 FEL
Sec. 6 Twp. 3S Rge. 96W

Other Services:
CBL-VDL
PDC-GR

Permanent Datum: GROUND LEVEL ; Elev.: 6737
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6737

Date 10-15-74
Run No. ONE

PLUG BACK TOTAL DEPTH
DRILLER- 1454
LOGGER-

DEPTHS BELOW RELATE TO: OPEN HOLE LOG MEASUREMENTS: ☐
: RADIOACTIVITY LOG MEASUREMENTS: ☒
: SCHLUMBERGER LINE MEASUREMENTS: ☐

CASING COLLARS		PERFORATING DATA				
		No.Shots	From	To	Gun Type	Gun Size
1130	1293	135	1126	1330	HYPERDOME	1 11/16
1169	1324					
1200	1355					
1231	1385					
1262	1416					

BORE HOLE RECORD			CASING RECORD				
Hole Size	From	To	Size	Type	Weight	From	To
4 3/4	SURF	TD	2 3/8		4.7	SURF	1460

HOLE FLUID DATA
Type Fluid: WATER
Density: ----
Fluid Level: [illegible]

Opr. Rig Time: 36 HOURS
Truck No. 56
Location: VERNAL
Recorded By: [illegible]. AUSTIN
Witnessed By: R. [illegible]

The well name, location and borehole reference data were furnished by the customer.

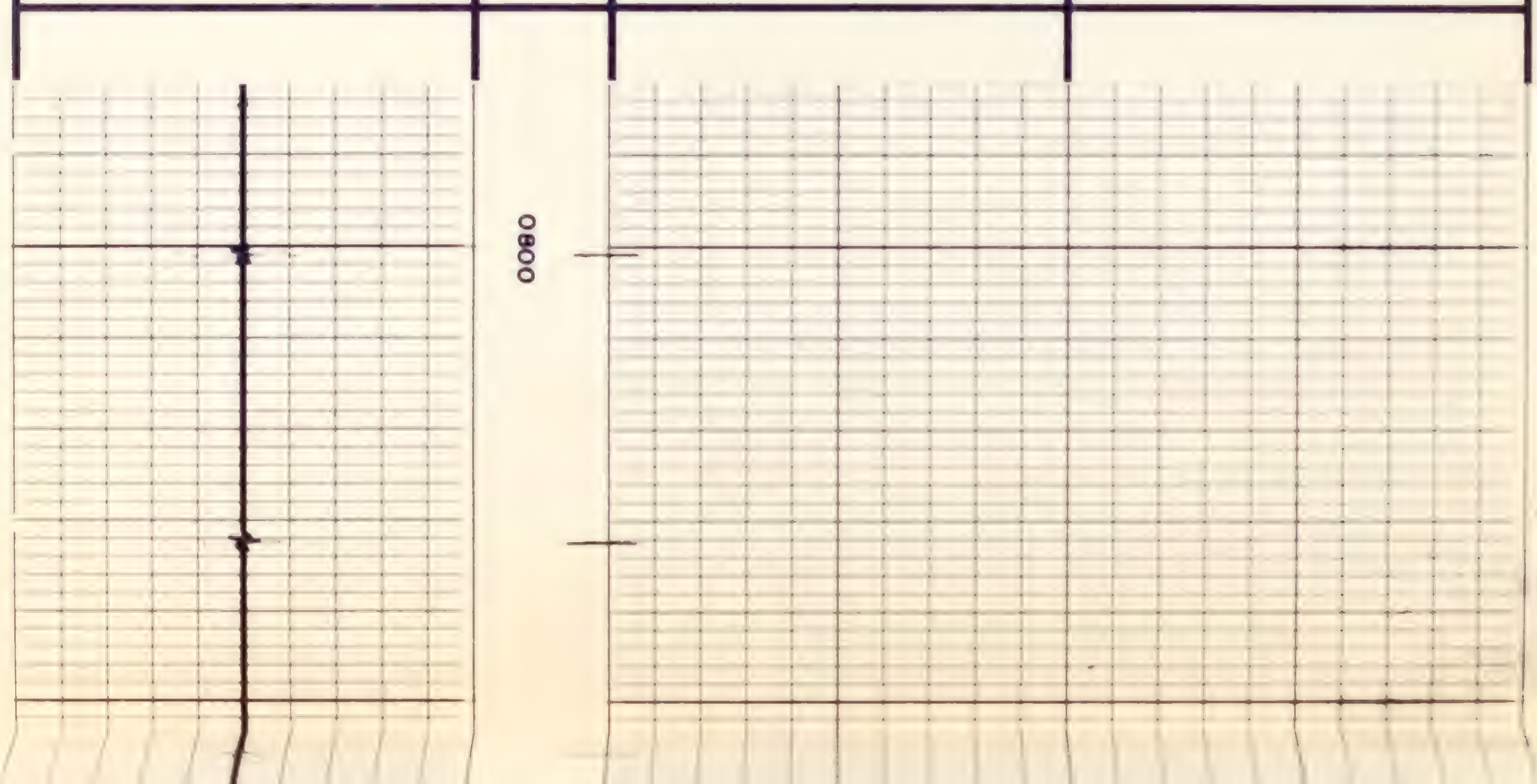
FOLD HERE

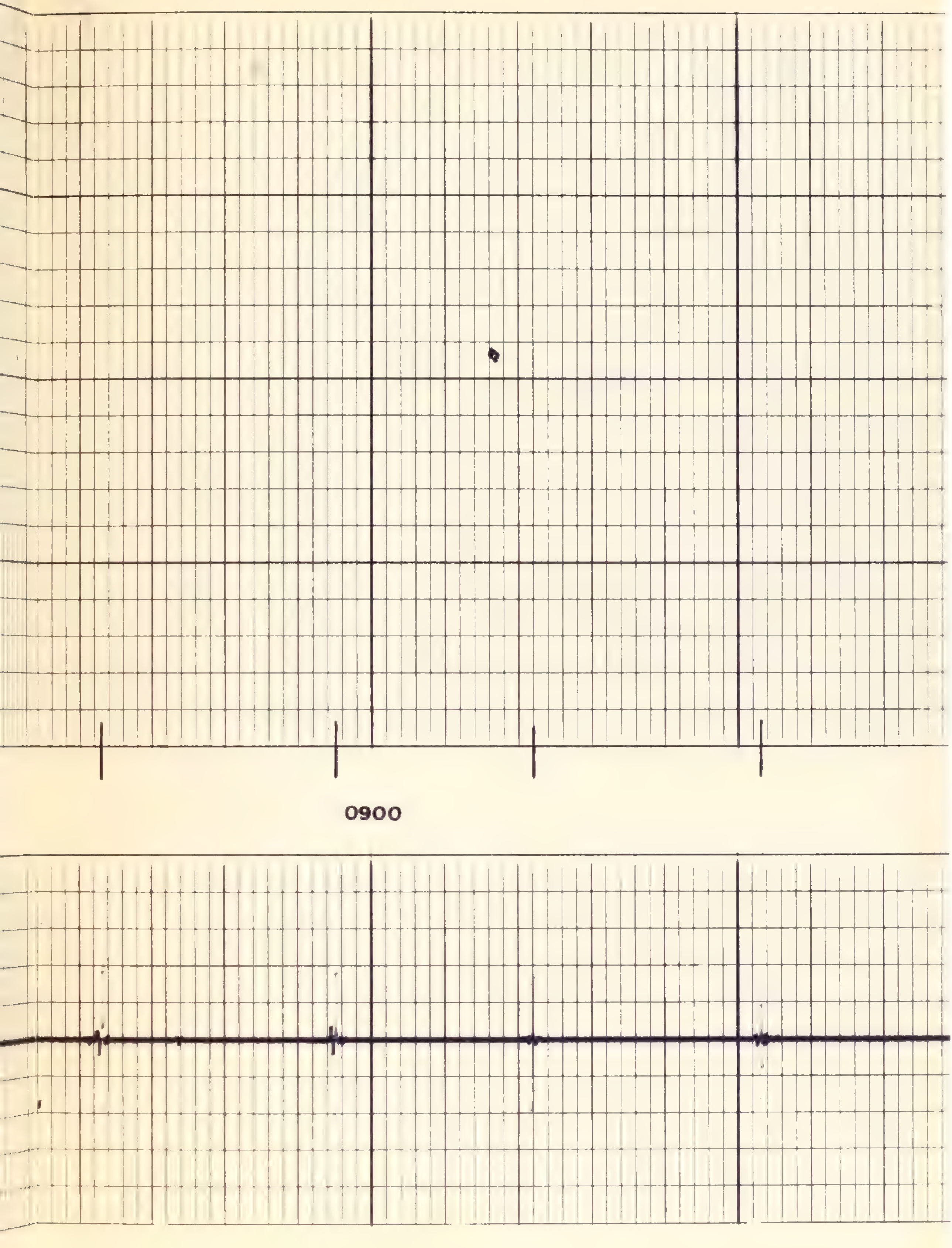
REMARKS

API Serial No.
Service Order No. [illegible]

CASING COLLAR LOG
BEFORE PERFORATION

DEPTHS

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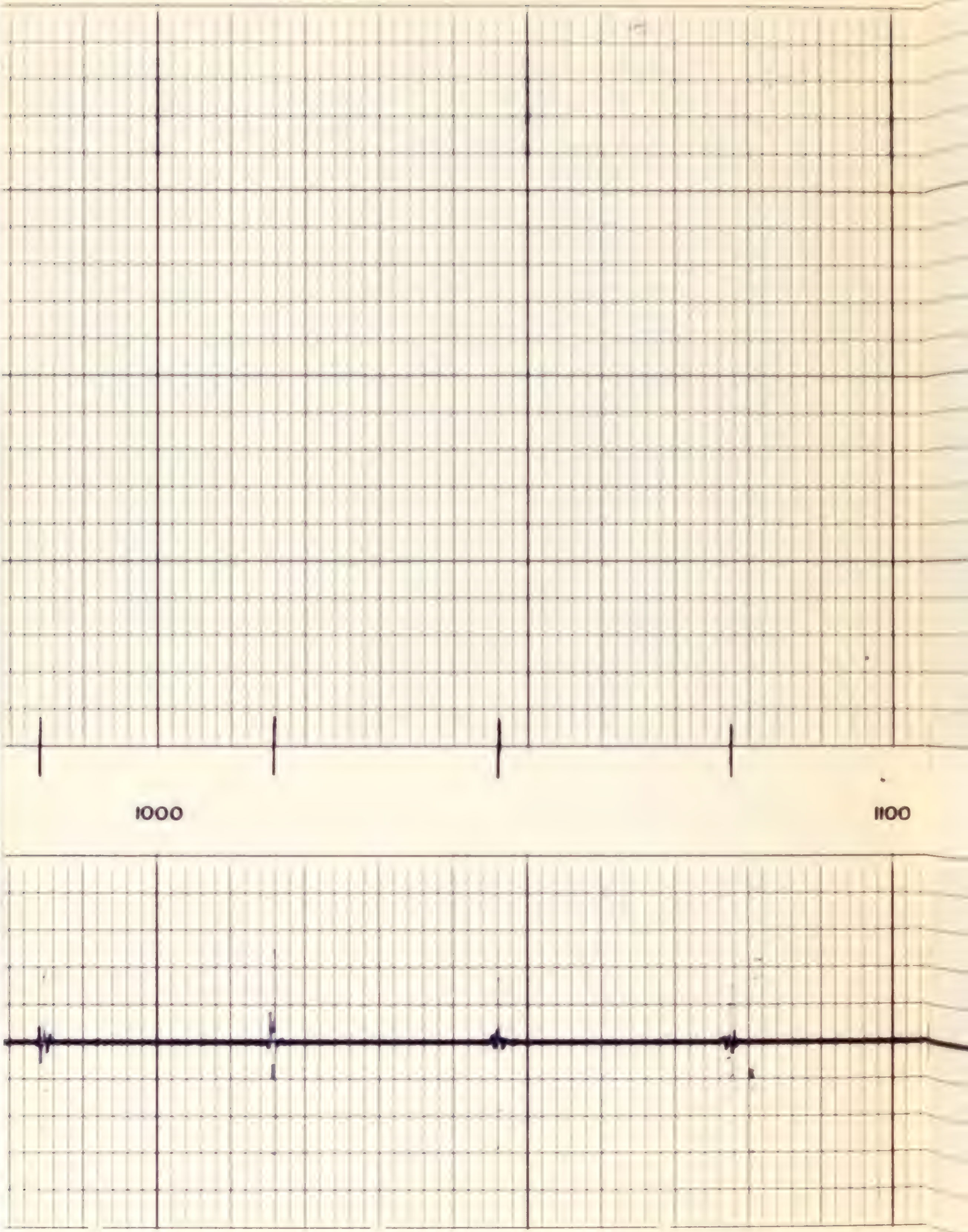
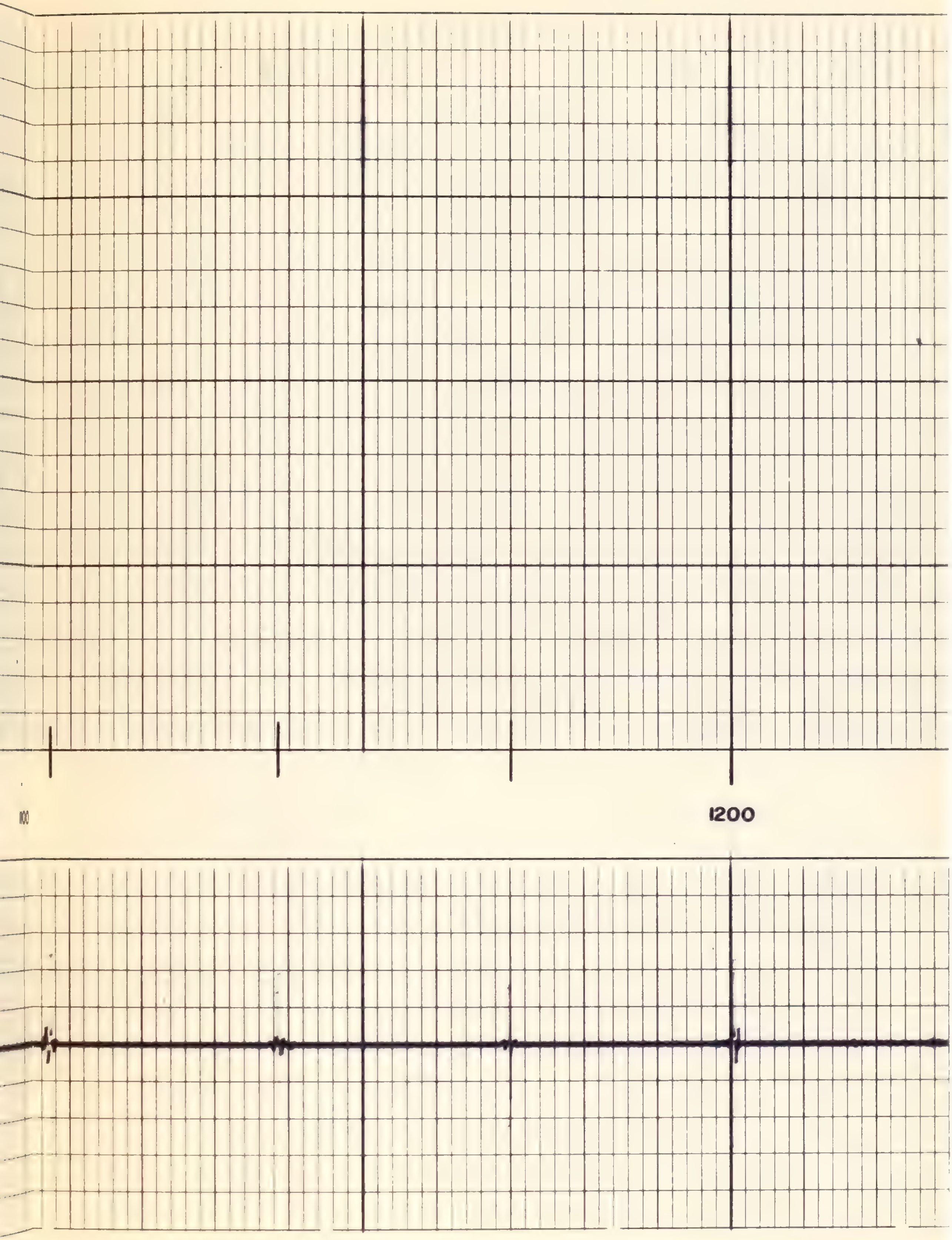
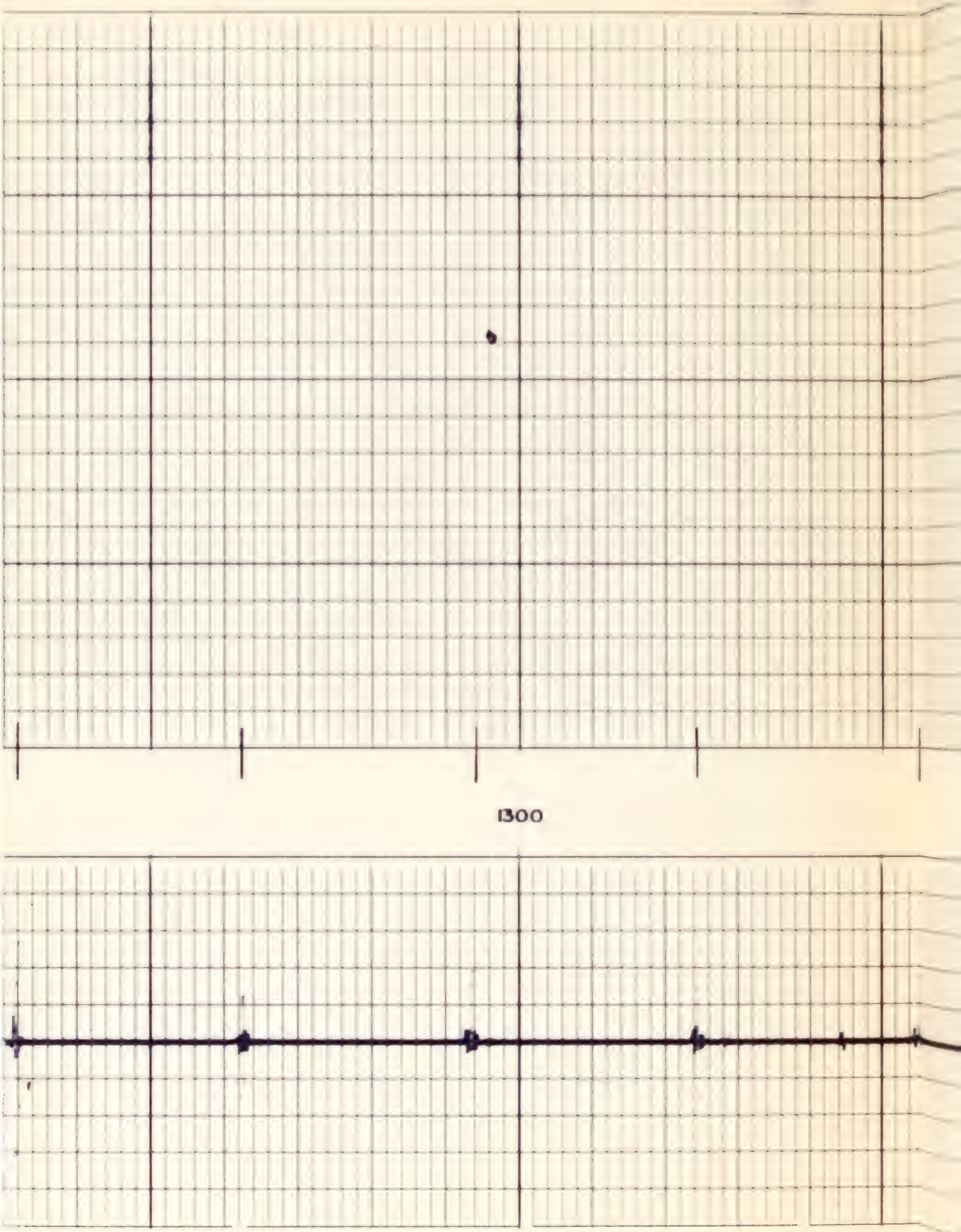

1000
1100


1100
1200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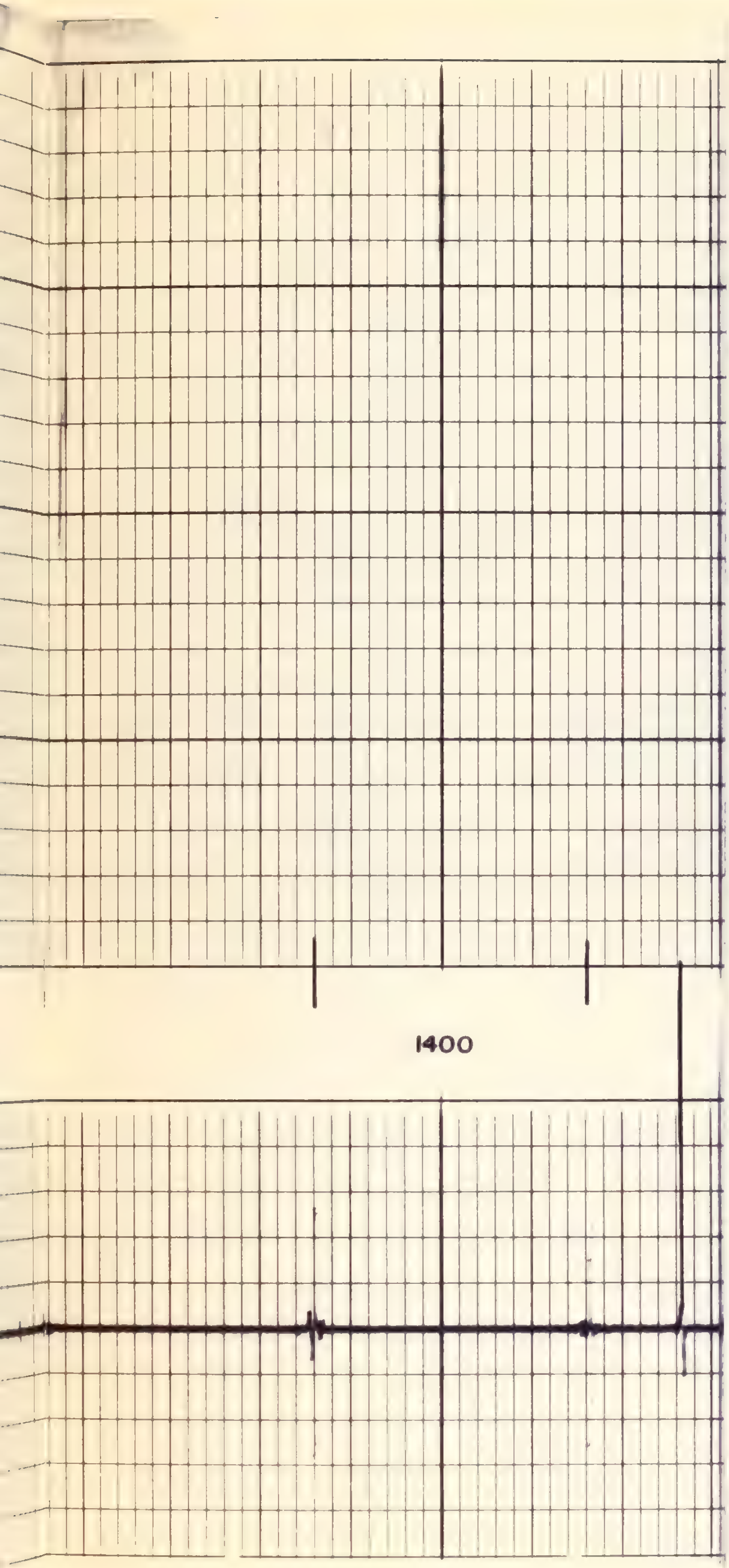
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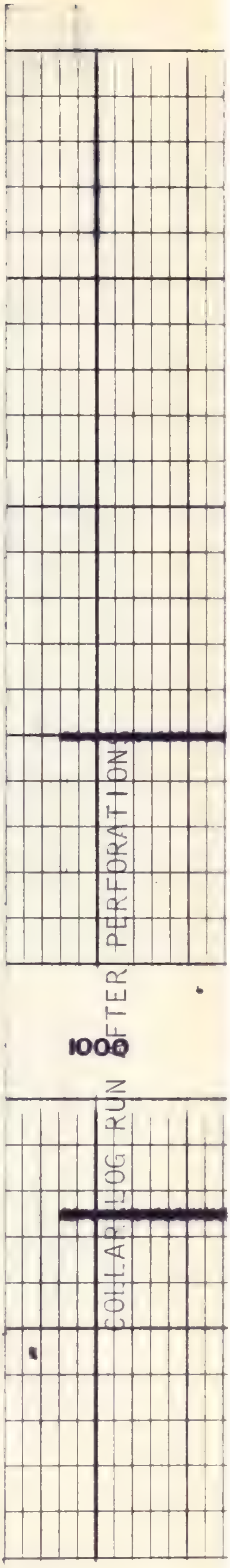
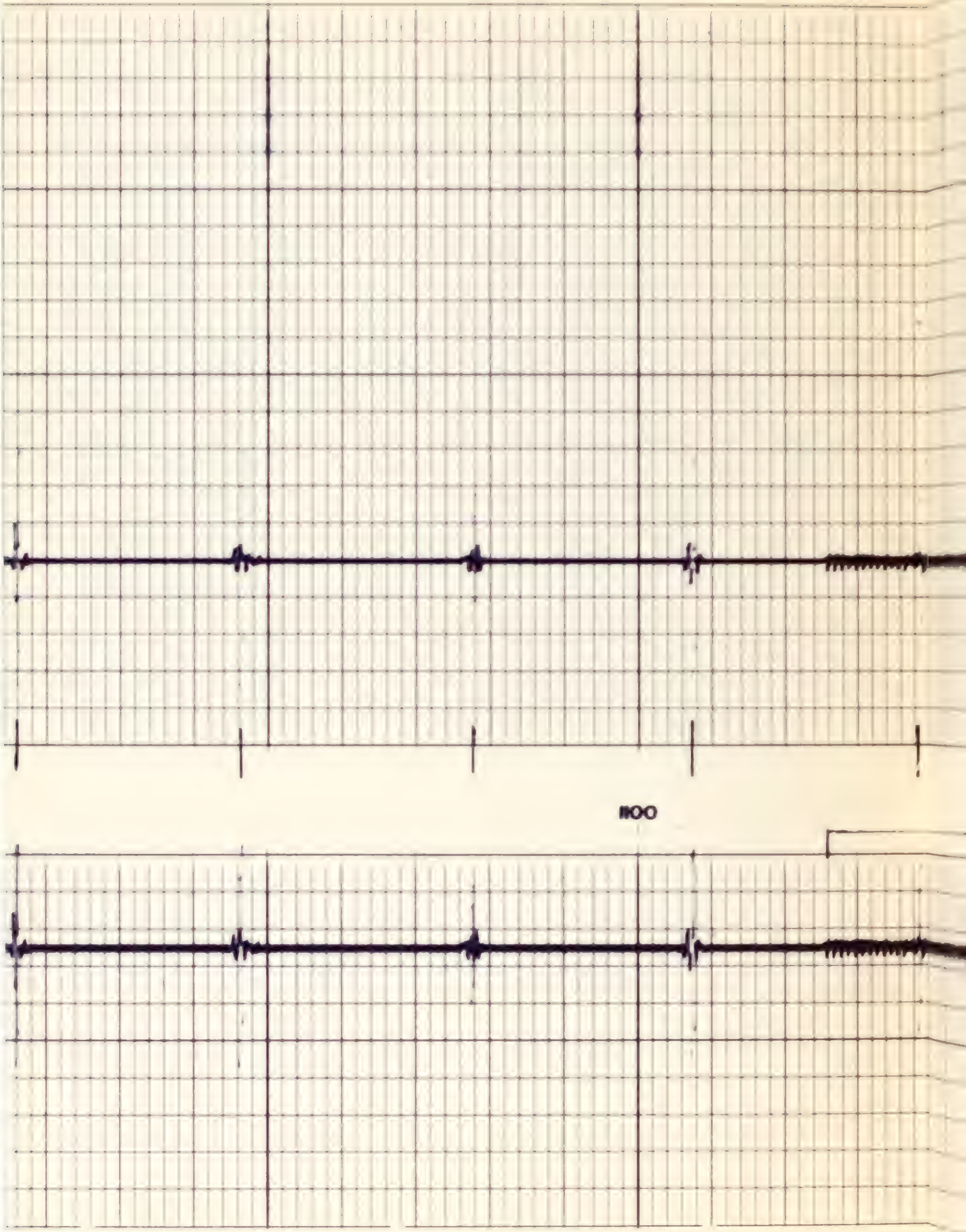
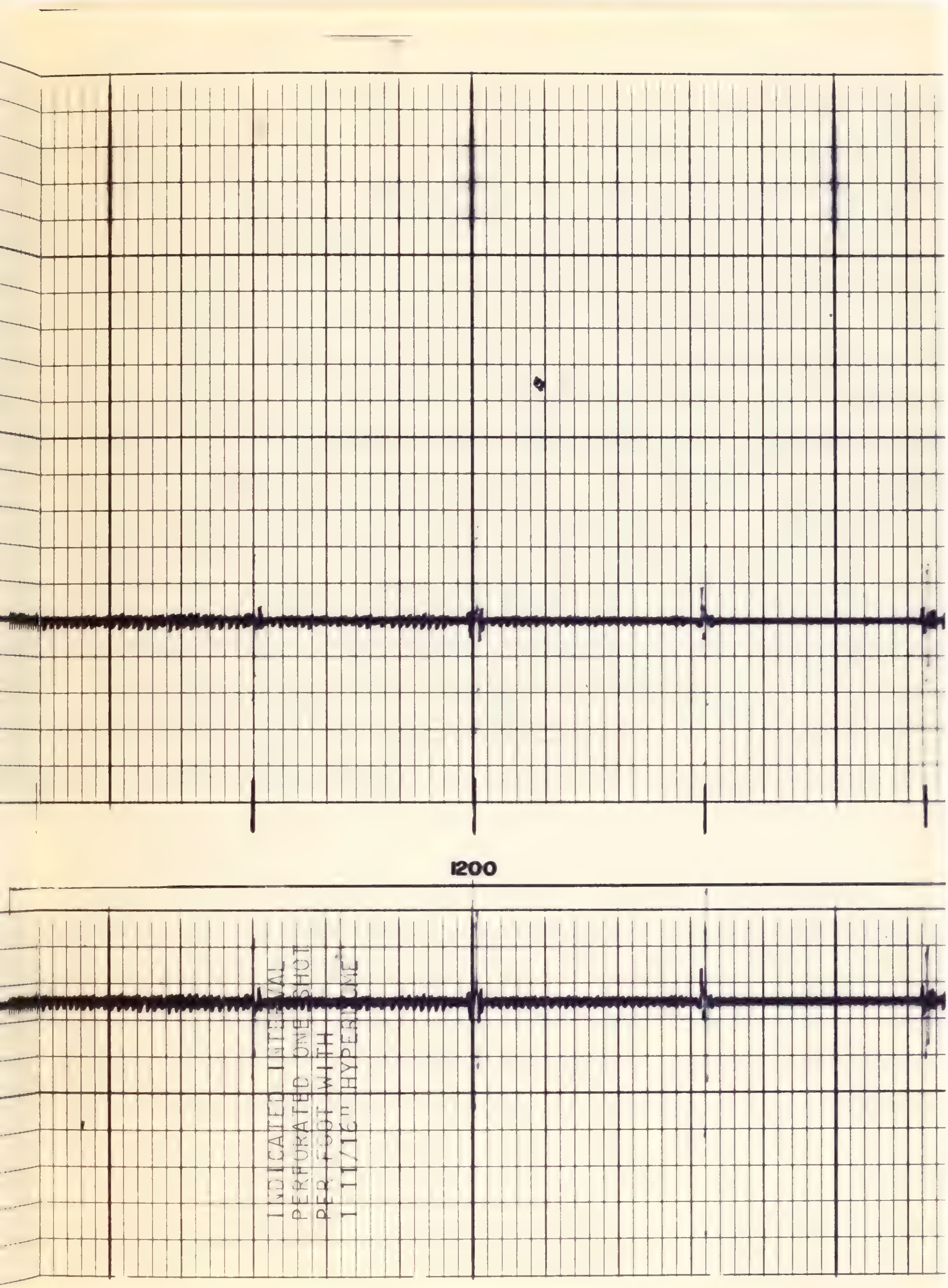
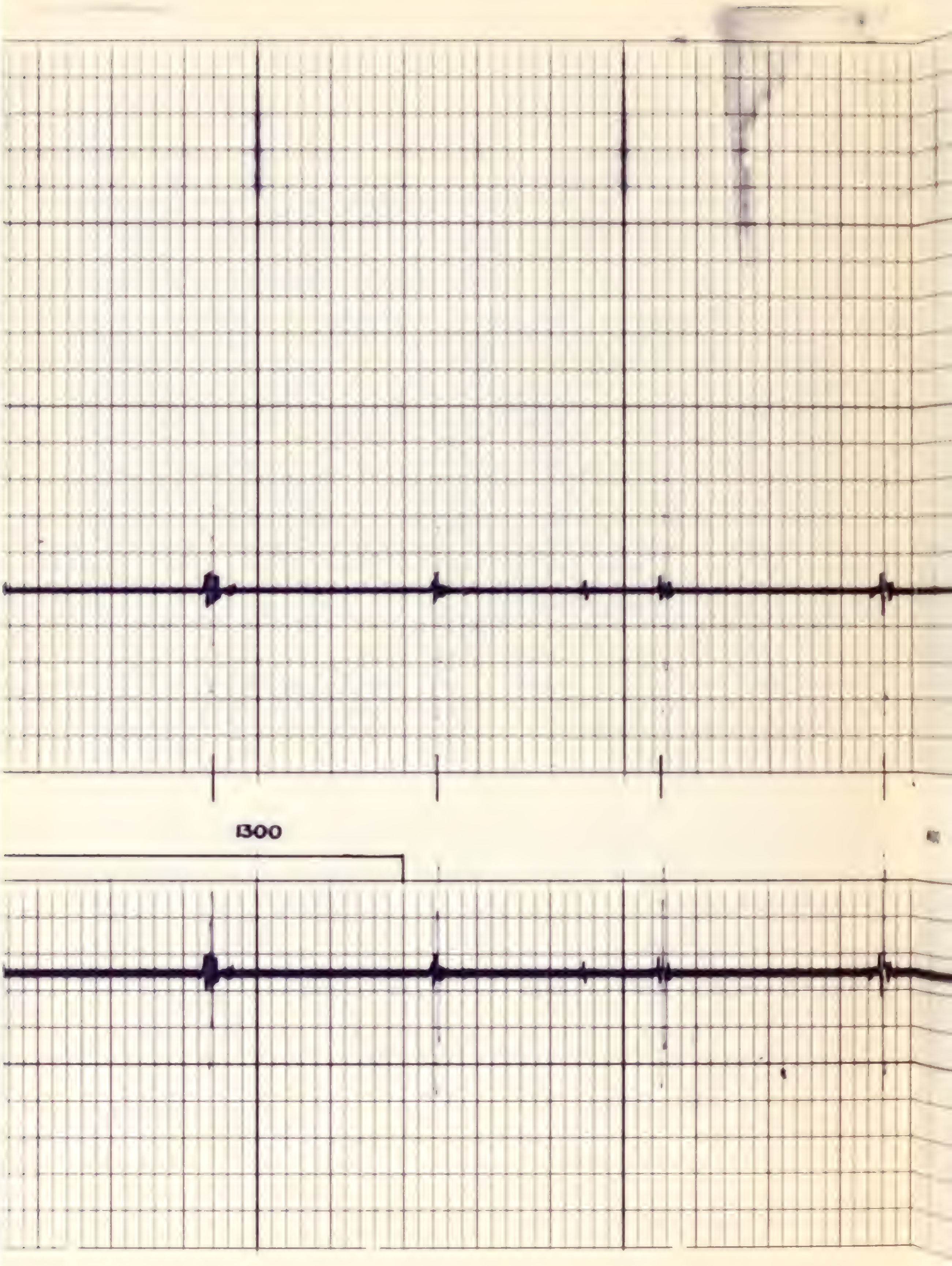

1000
COLLAR LOG RUN AFTER PERFORATIONS


1100



INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME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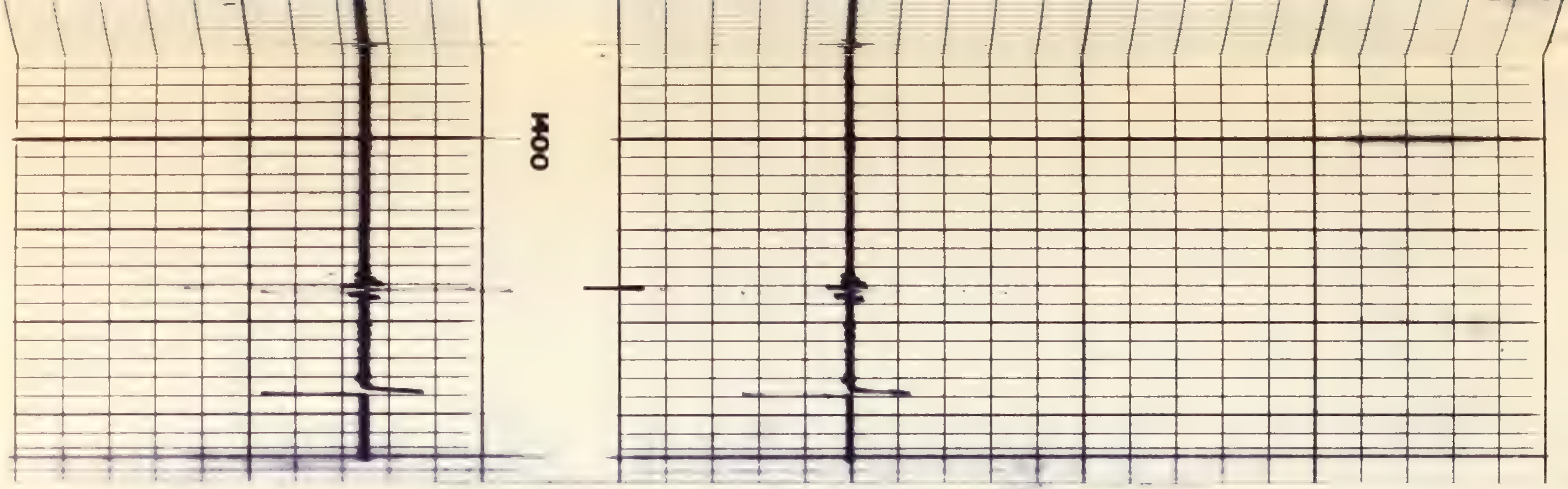


DEPTHS

CASING COLLAR LOG
AFTER PERFORATION

COMPANY ATLANTIC RICHFIELD COMPANY
WELL [illegible]
FIELD
COUNTY RIO BLANCO STATE COLORADO

SCHL. TD
DRLR TD

Elev:
KB ----
DF ----
GL 6737

Schlumberger

PERFORATING DEPTH CONTROL

COUNTY RIO BLANCO
FIELD or LOCATION
WELL CB-2
COMPANY ATLANTIC RICHFIEL COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-2

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location
1589' FSL & 1300' FEL
Sec. 6 Twp. 3S Rge. 96W

Other Services:
CBL-VDL
SPH

Permanent Datum: GROUND LEVEL ; Elev.: 6737
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6737

Date	10-14-74		
Run No.	ONE		
Type Log	GAMMA RAY		
Depth — Driller	1454		
Depth — Logger	1441		
Bottom logged interval	1430		
Top logged interval	1000		
Type fluid in hole	WATER		
Salinity, PPM Cl.	-----		
Density	-----		
Level	FULL		
Max. rec. temp., deg F.	-----		
Operating rig time	ONE HOUR		
Recorded By	ST. AUBYN		
Witnessed By	MR. ELLARD		

BORE-HOLE RECORD

Bit Size	From	To
4 3/4	SURF	TD

CASING RECORD

Size	Wgt.	From	To
2 3/8	4.7	SURF	1460

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

EQUIPMENT DATA

Gamma Ray

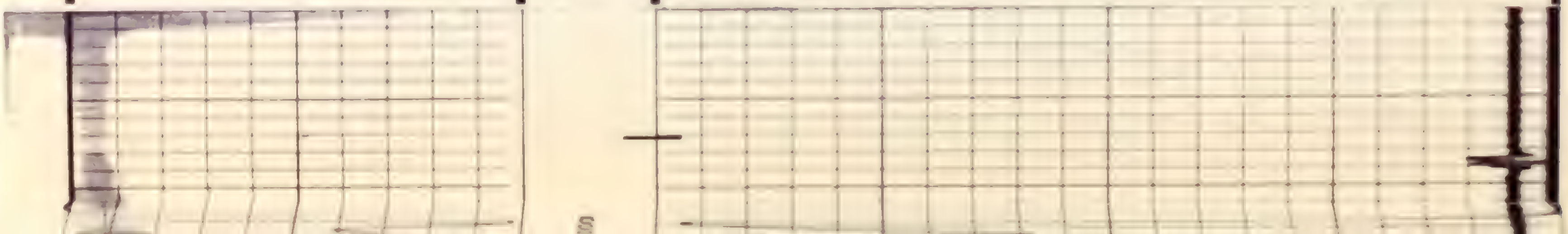
Run No.	ONE
Tool Model No.	GNT-K
Diameter	1 11/16"
Det'r Model No.	SGD-H
Type	SCINT
Length	8"
S. O. No.	49327

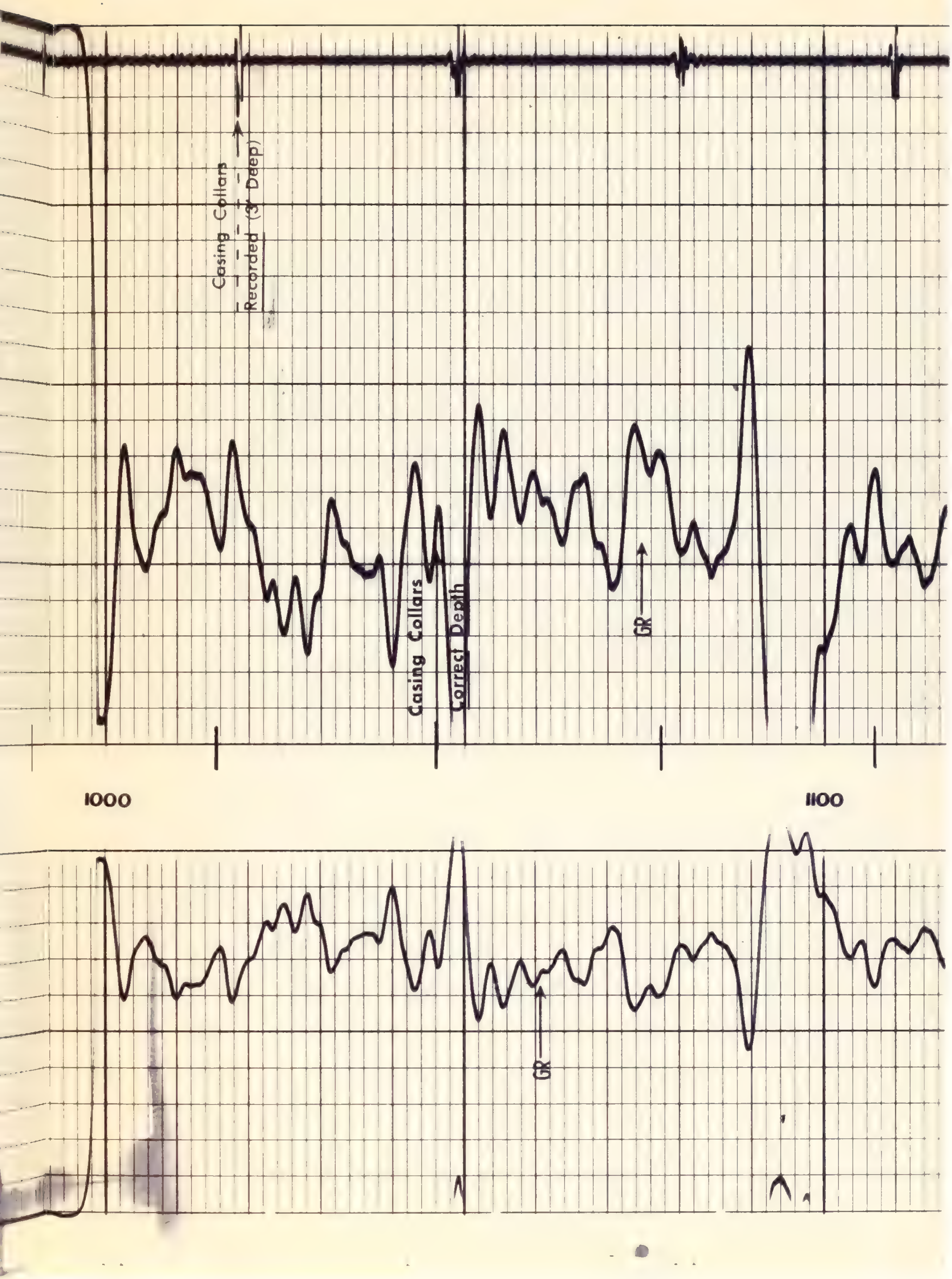
General

Hoist Truck No.	3362
Inst. Truck No.	3362
Tool Serial No.	16
Location	VERNAL

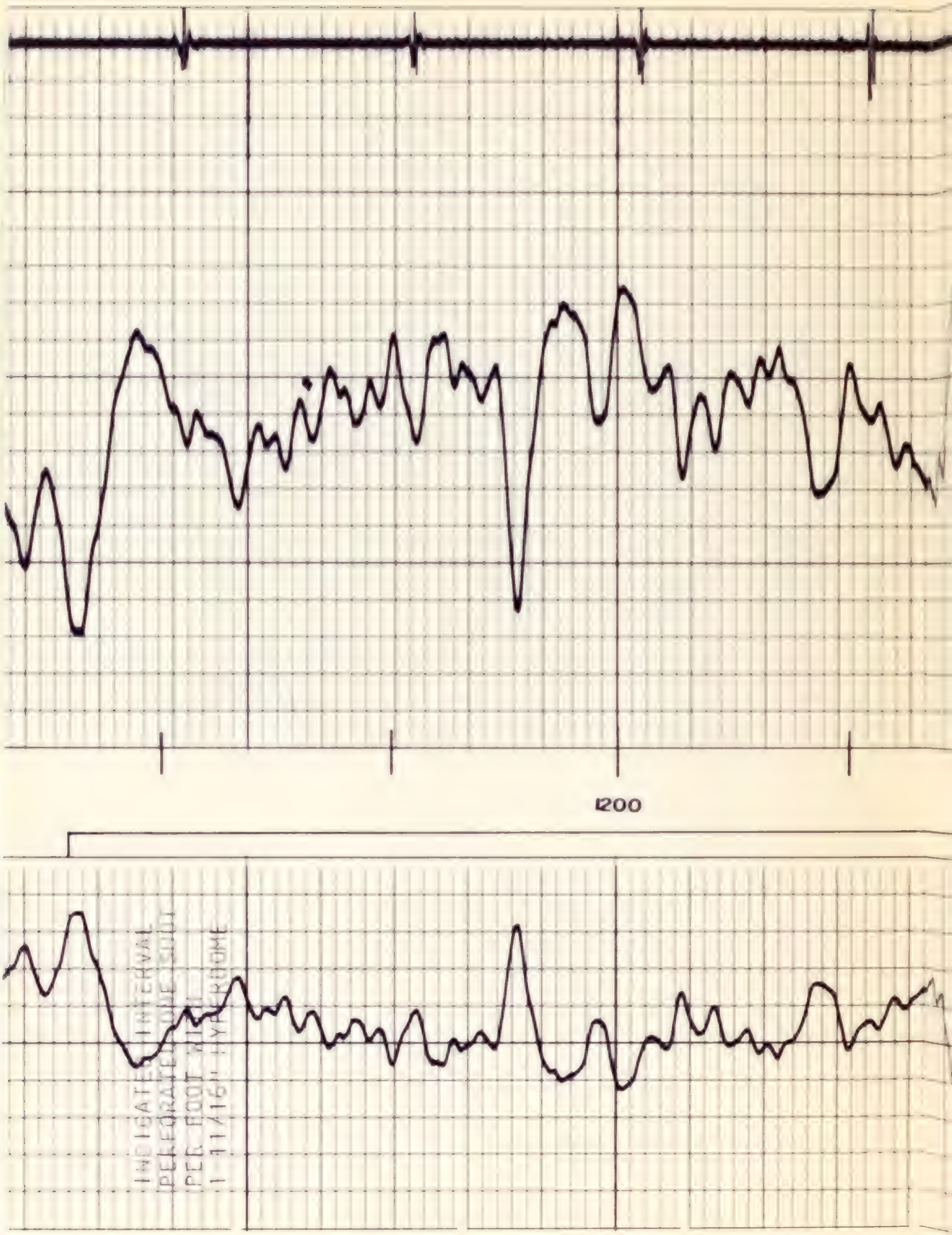
Remarks: Casing Collars recorded 3 ft. [illegible], Corrected collar depths are shown in the depth track.

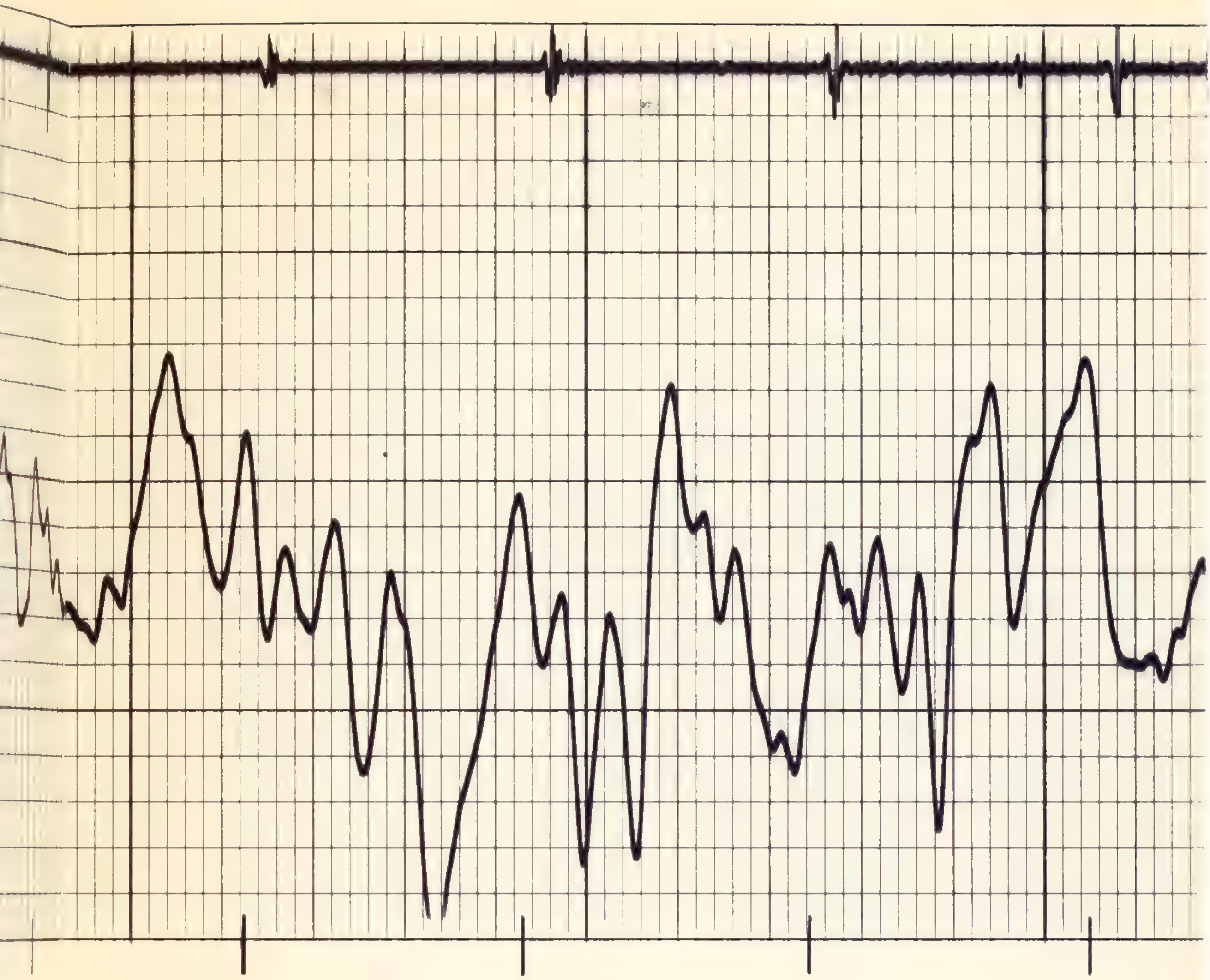
GAMMA RAY RADIOACTIVITY INCREASES →	DEPTHS	GAMMA RAY ← RADIOACTIVITY INCREASES
		Casing Collars Correct Depth ↓ Recorded Casing Collars ↓





Casing Collars
Recorded (3' Deep)
Casing Collars
Correct Depth
GR
1000
1100
GR


1200
INDICATES INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME



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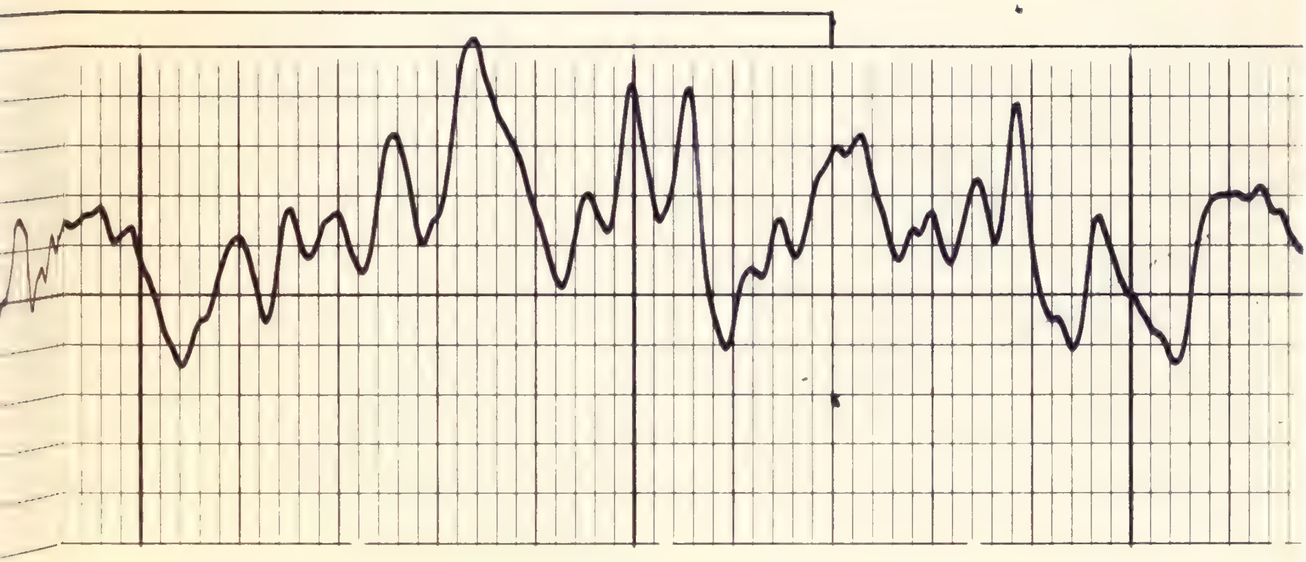
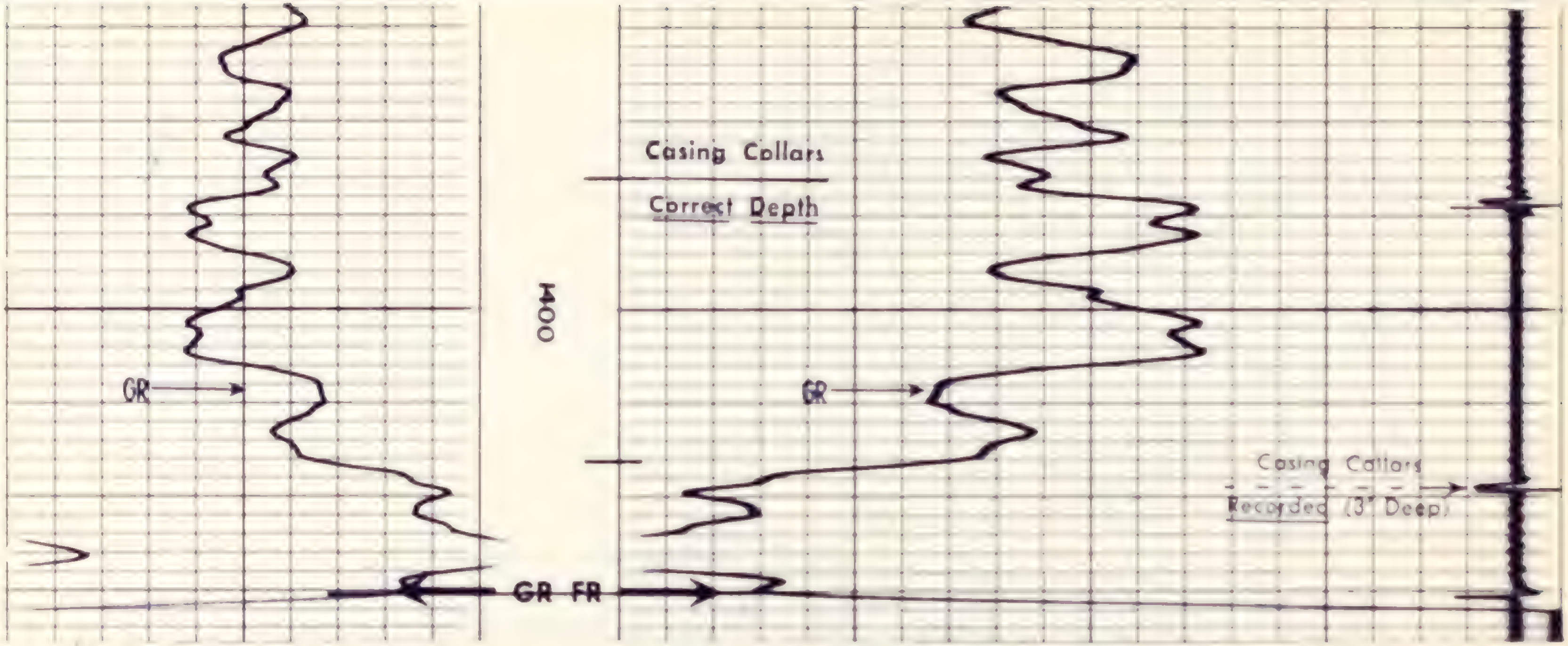




Casing Collars
Correct Depth

Recorded
Casing Collars

GAMMA RAY
RADIOACTIVITY INCREASES

DEPTHS

GAMMA RAY
RADIOACTIVITY INCREASES

COMPANY ATLANTIC RICHFIELD COMPANY
WELL CB-2
FIELD
[illegible]

SCHL FR [illegible]
SCHL TD 1441
DRLR. TD [illegible]

COMPANY [illegible] [illegible]
WELL
FIELD

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR [illegible]
SCHL. TD [illegible]
DRLR. TD [illegible]

COUNTY
FIELD
LOCATION

Schlumberger

CASING COLLAR LOG AND PERFORATING RECORD

COUNTY RIO BLANCO
FIELD or LOCATION
WELL CB- NO. 4
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-NO.4

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location:
1451' FSL - 960' FWL
Sec. 17 Twp. 3S Rge. 96W

Other Services:
CBL-VDL-CCL
PDC-GR

Permanent Datum: GROUND LEVEL ; Elev.: 7054
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. -----
D.F. -----
G.L. 7054

Date 9-24-74
Run No. ONE
PLUG BACK TOTAL DEPTH DRILLER- 1469 LOGGER- 1464
DEPTHS BELOW RELATE TO: OPEN HOLE LOG MEASUREMENTS: ☐
: RADIOACTIVITY LOG MEASUREMENTS: ☒
: SCHLUMBERGER LINE MEASUREMENTS: ☐

CASING COLLARS		PERFORATING DATA				
		No.Shots	From	To	Gun Type	Gun Size
1154	1311.5	136	1190	1324	HYPER DOME	1 11/16
1185	1342.					
1217	1373.5					
1248	1405					
1280	1435					

BORE HOLE RECORD			CASING RECORD				
Hole Size	From	To	Size	Type	Weight	From	To
4 3/4	60	1502	8 5/8			SURF	60
			2 5/8		4.7	SURF	1469

HOLE FLUID DATA			
Type Fluid:	WATER	Opr. Rig Time:	19 HOURS
Density:	------	Truck No.	3862
Fluid Level:	FULL	Location:	VERNAL
		Recorded By:	ST. AUBYN
		Witnessed By:	MR. ELLARD

The well name, location and borehole reference data were

FOLD HERE

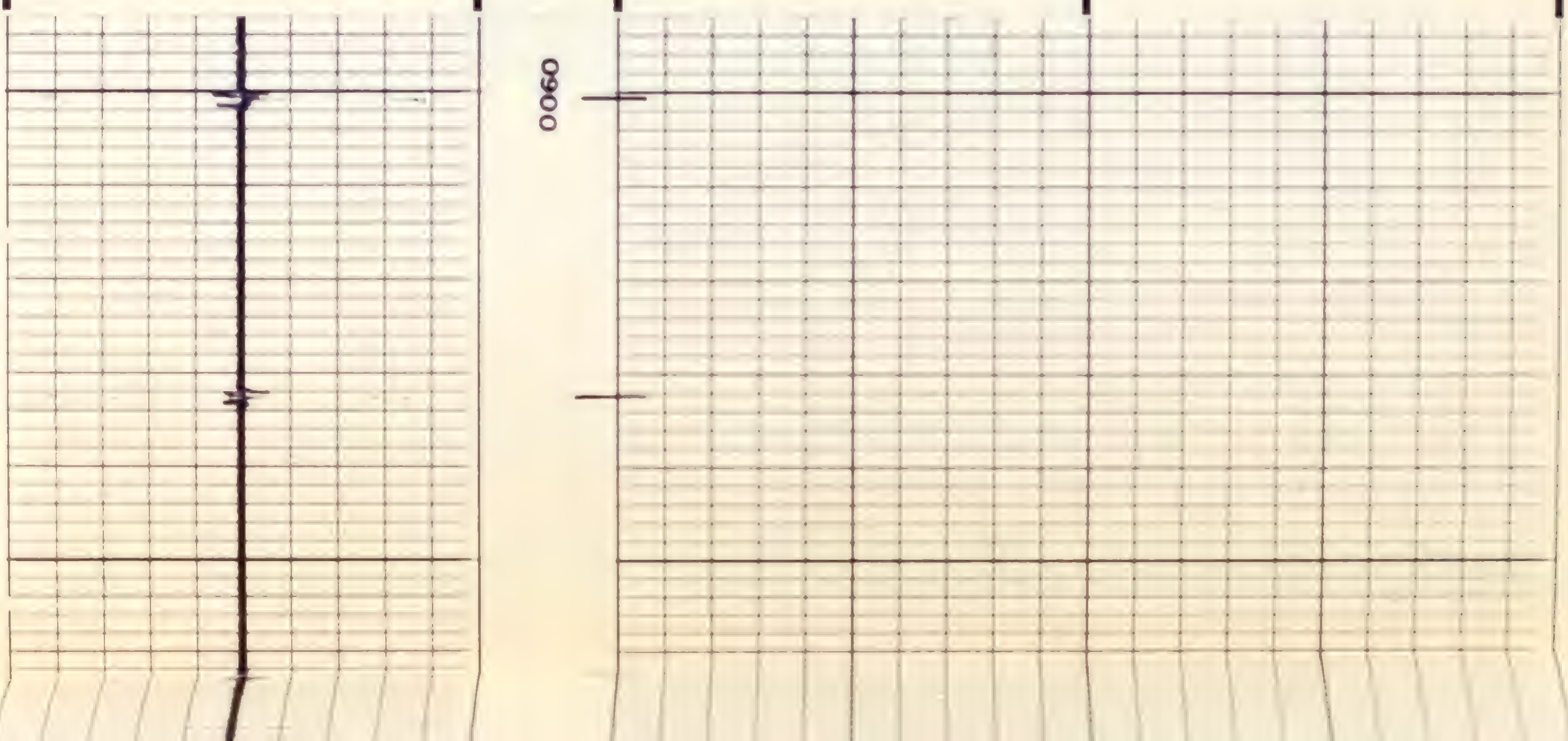
data were furnished by the customer.

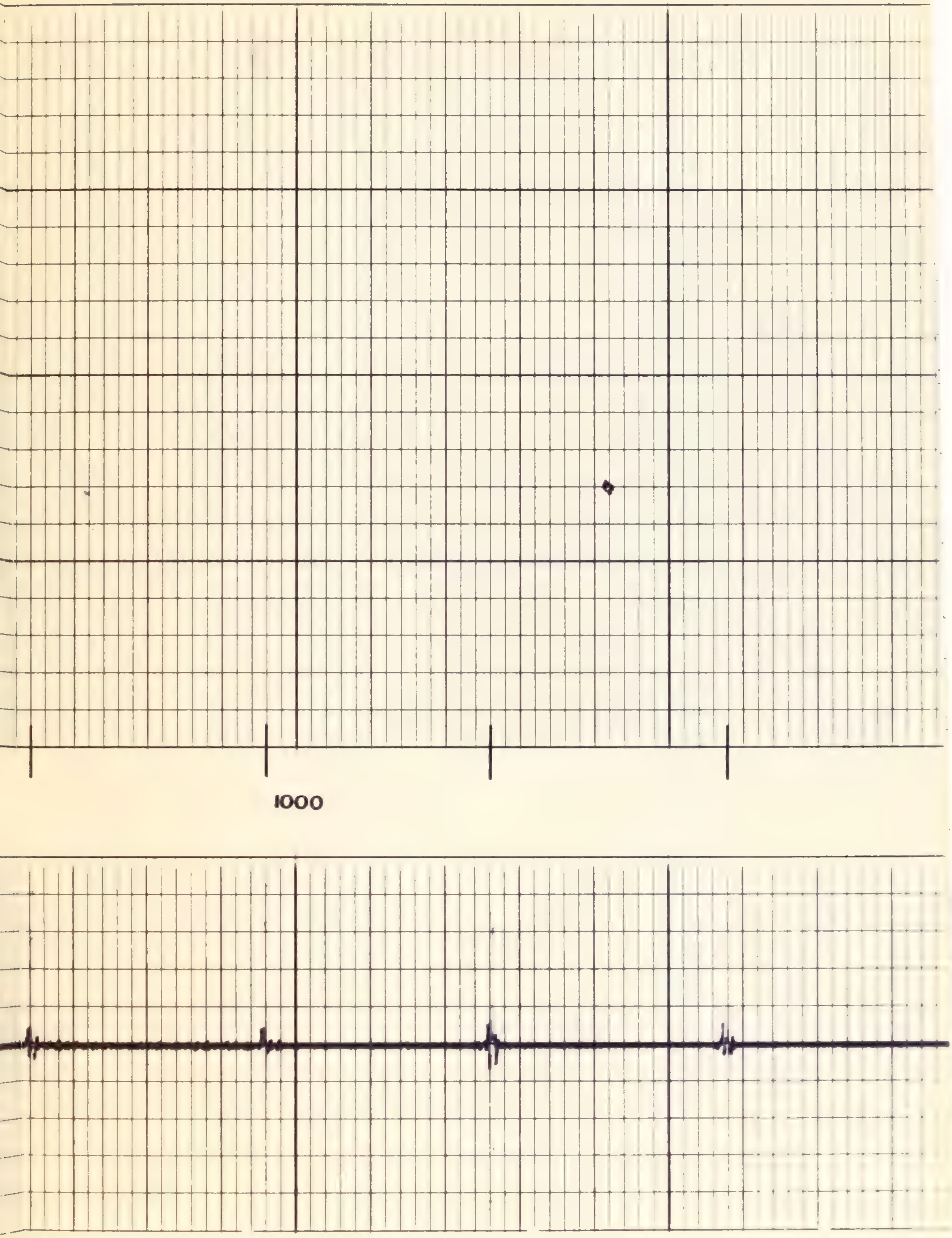
REMARKS

API Serial No. NA

Service Order No. 49329

CASING COLLAR LOG BEFORE PERFORATION	DEPTHS		

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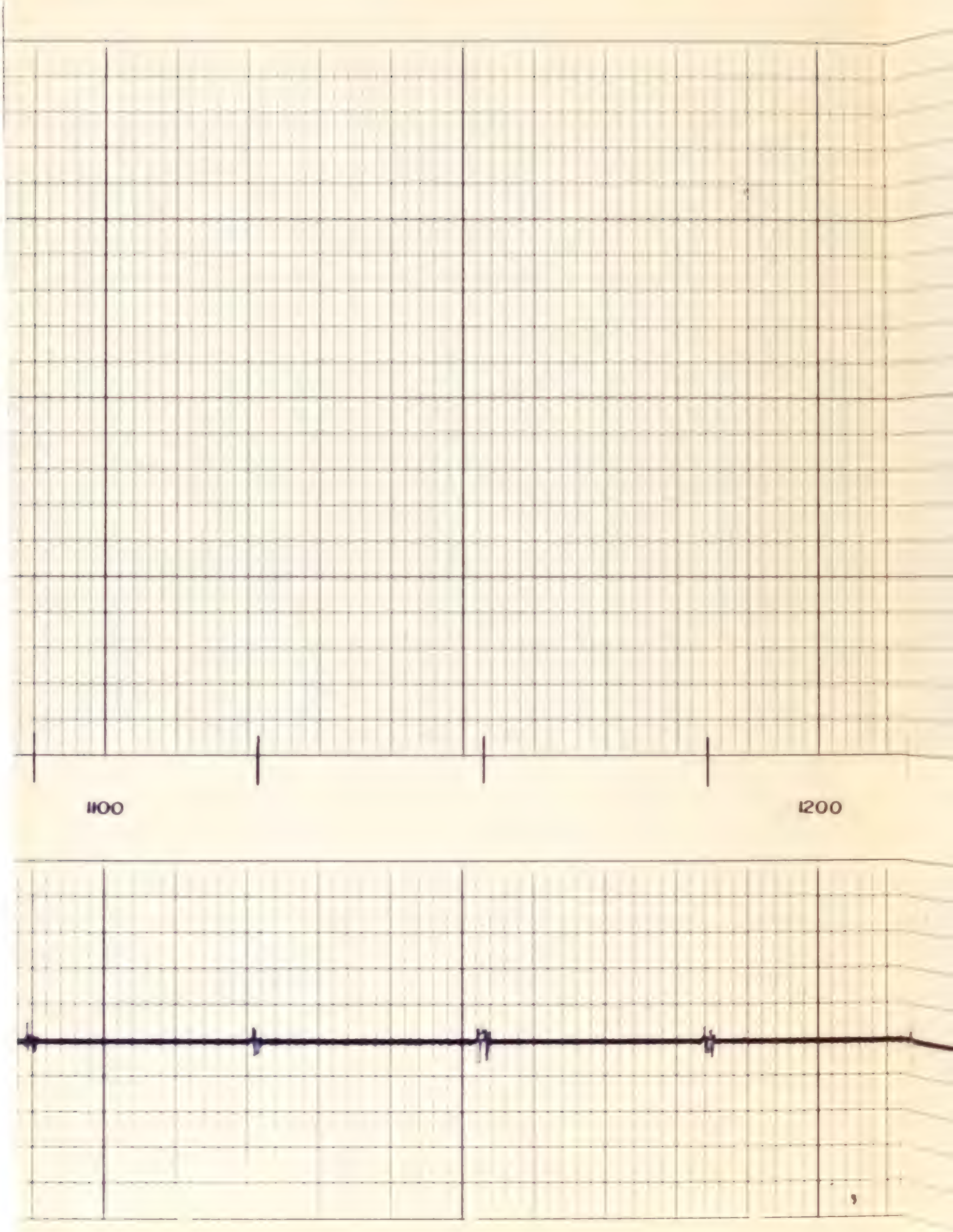
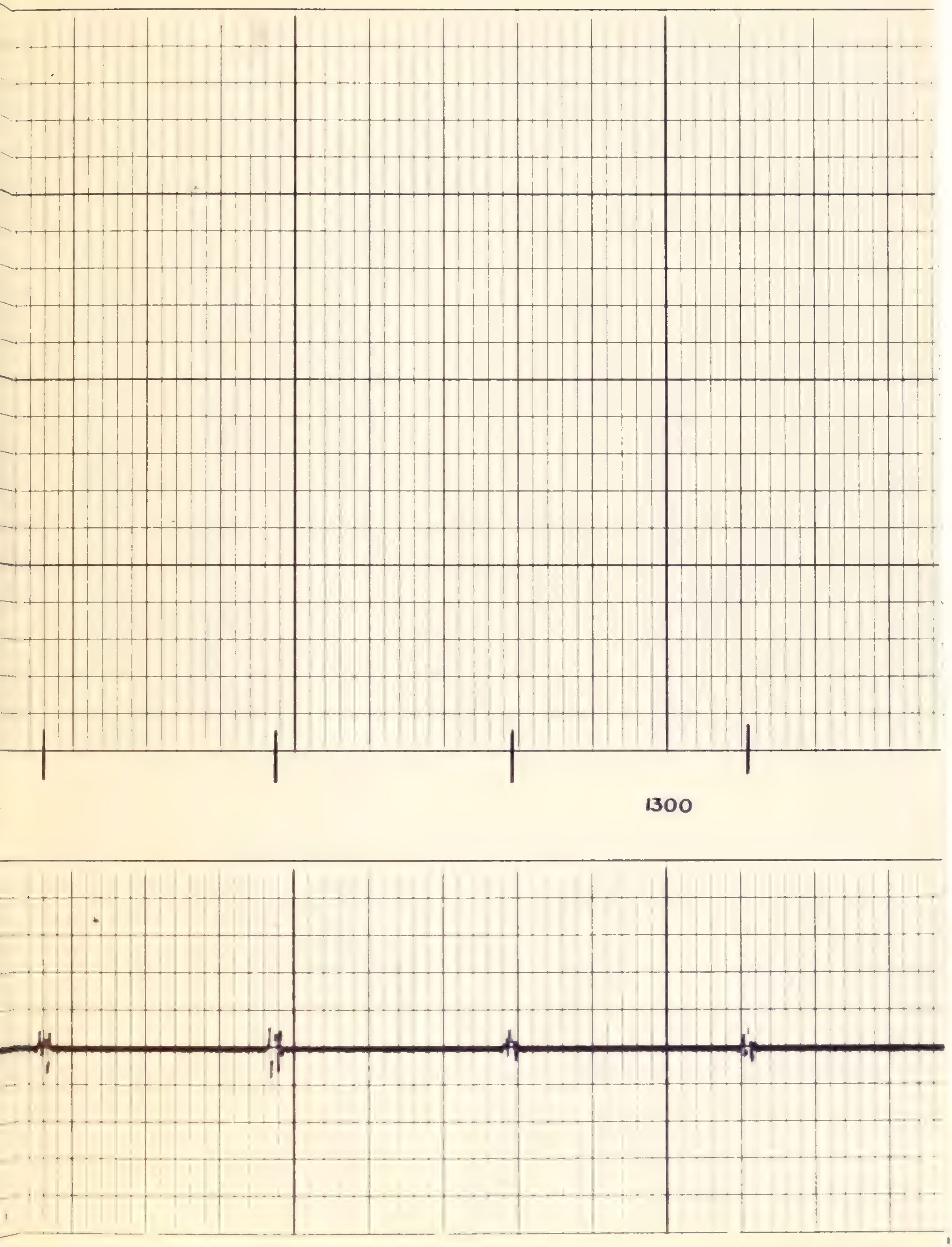

1100
1200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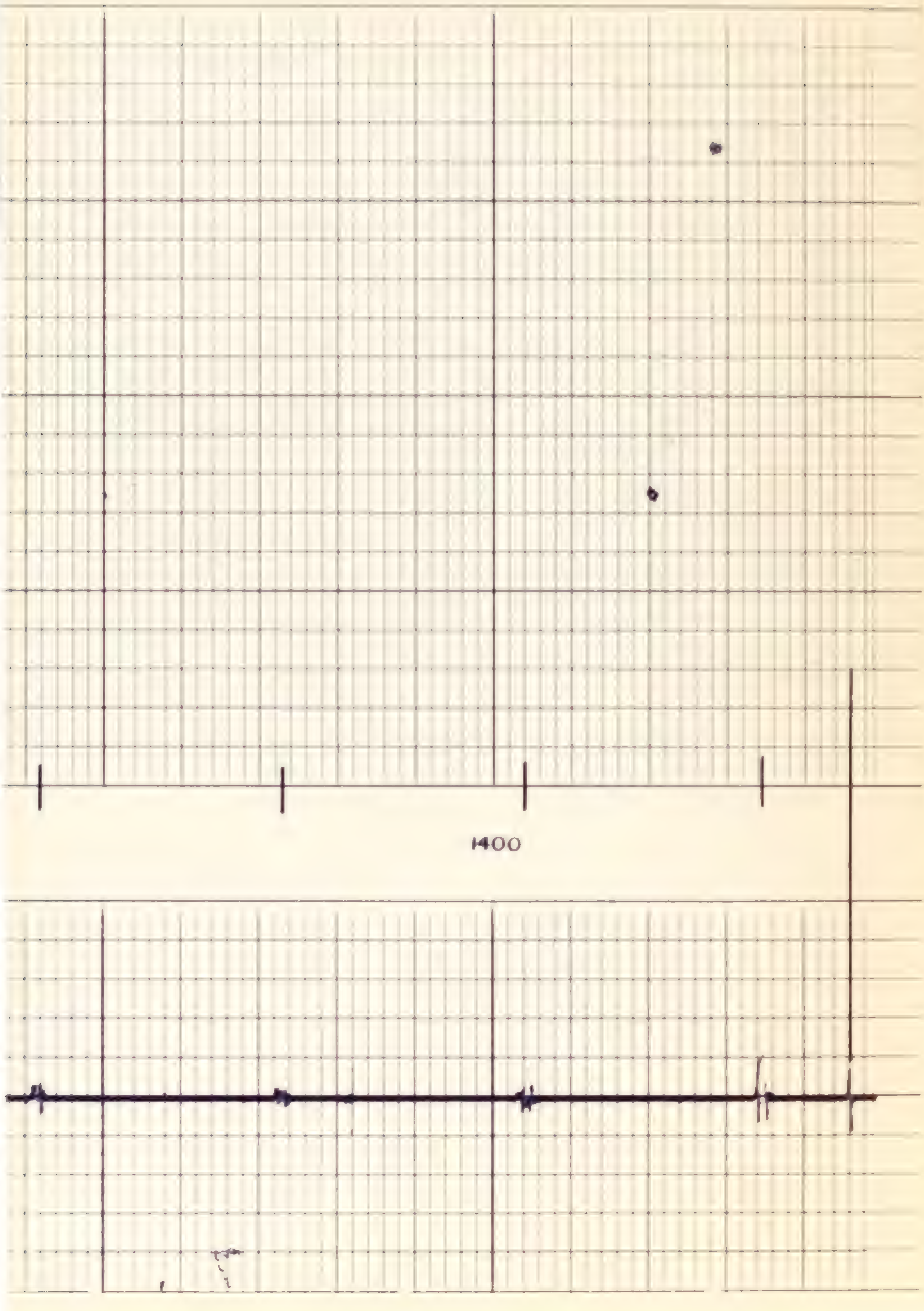
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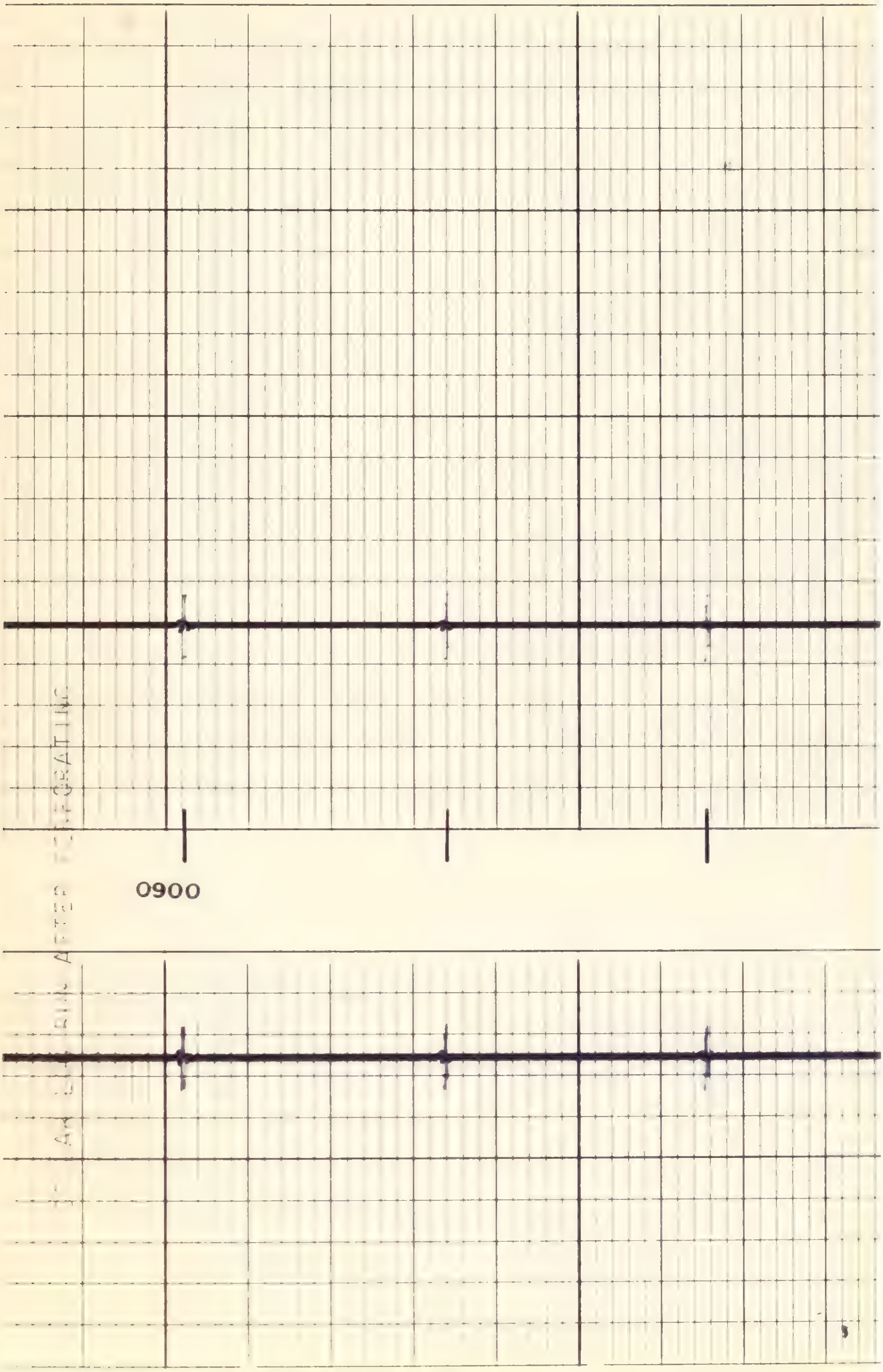
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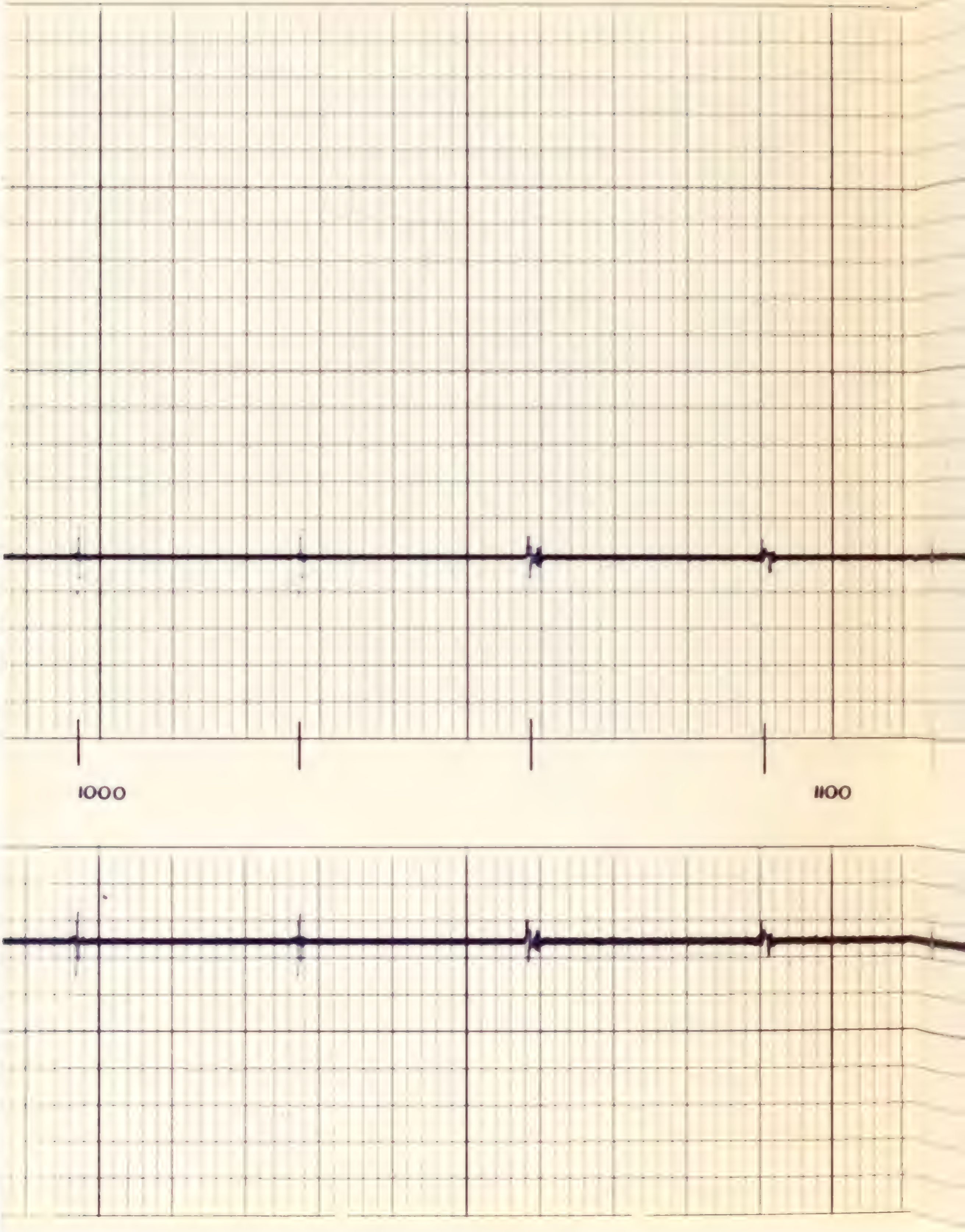
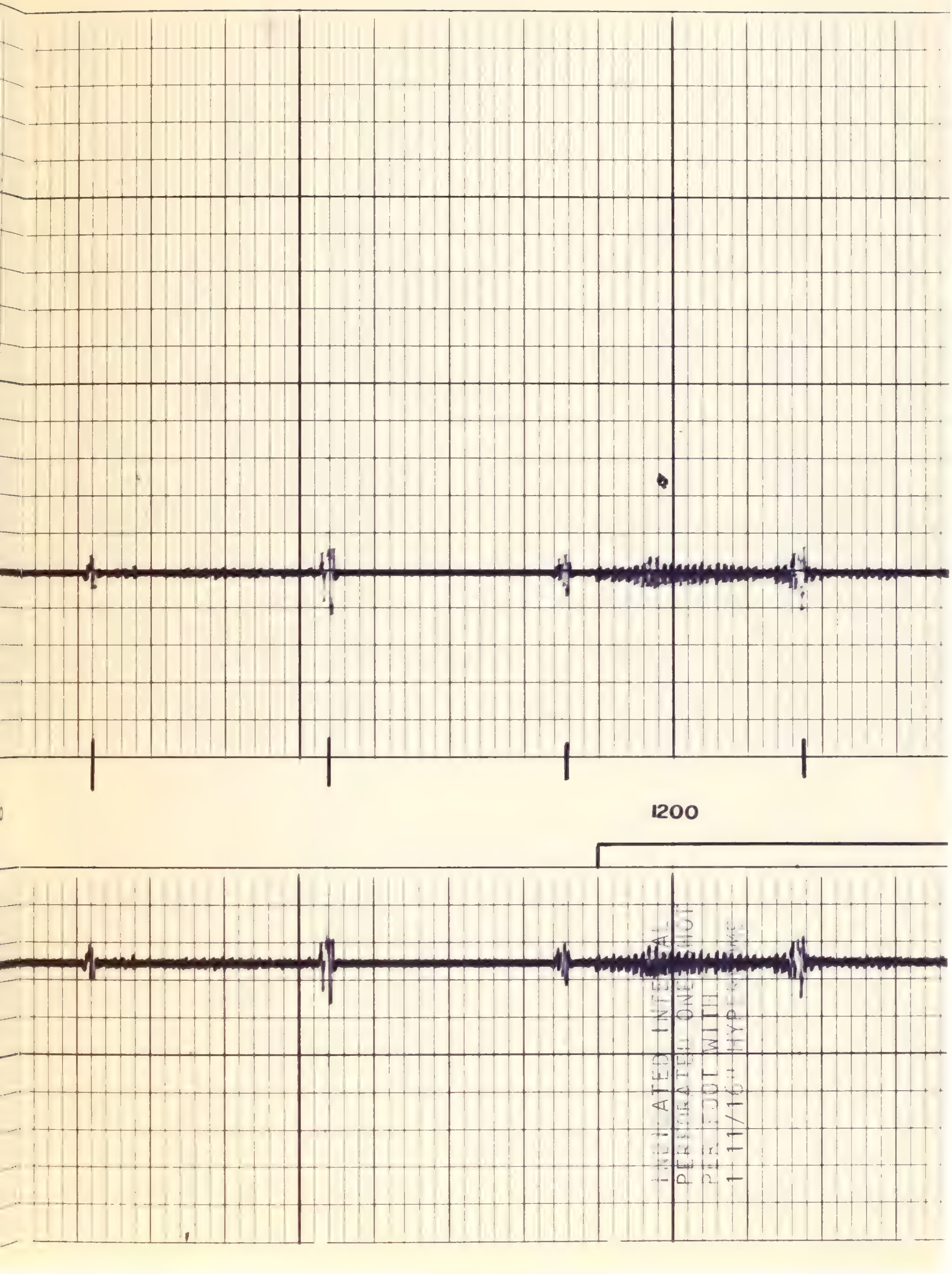
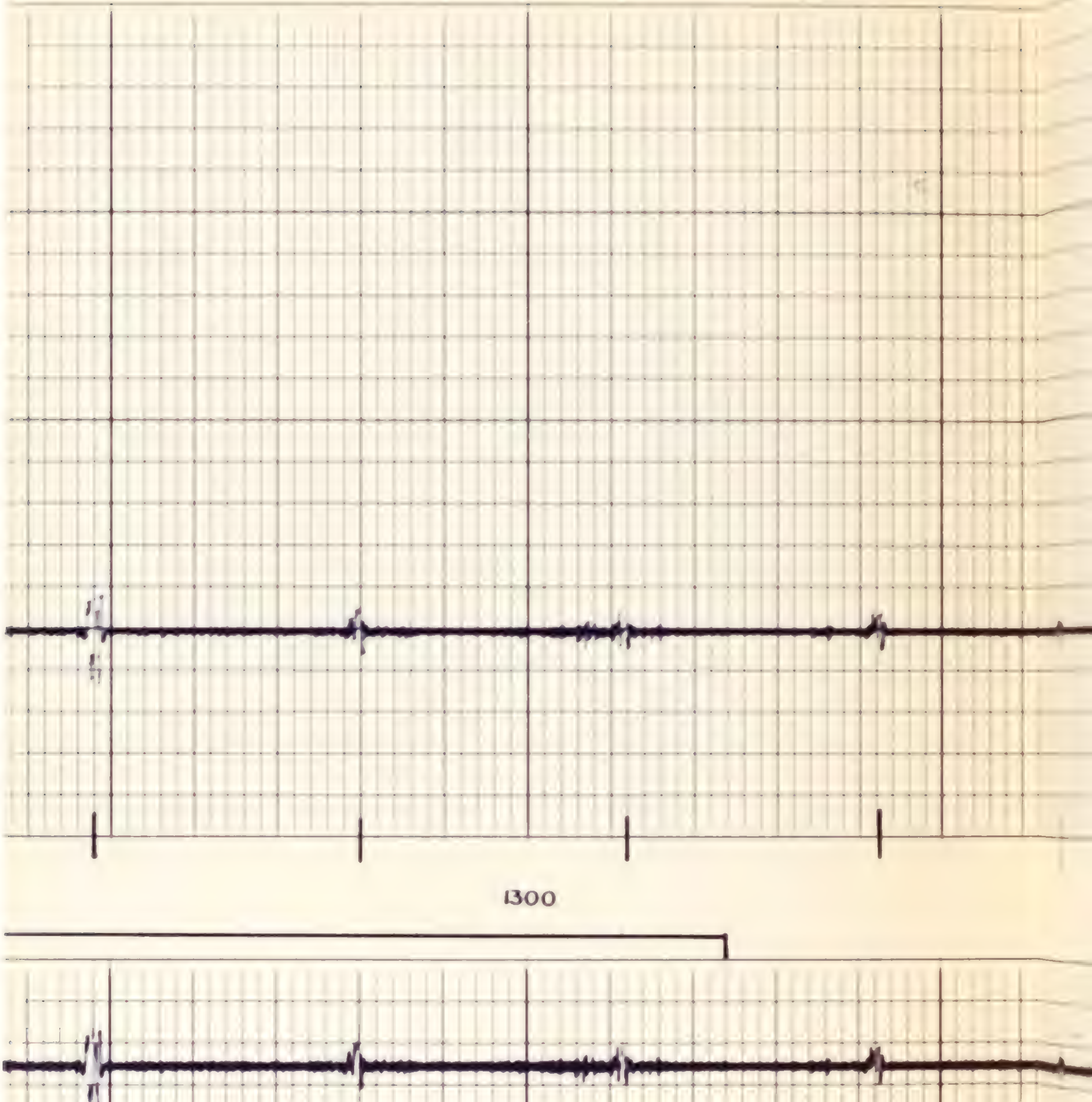
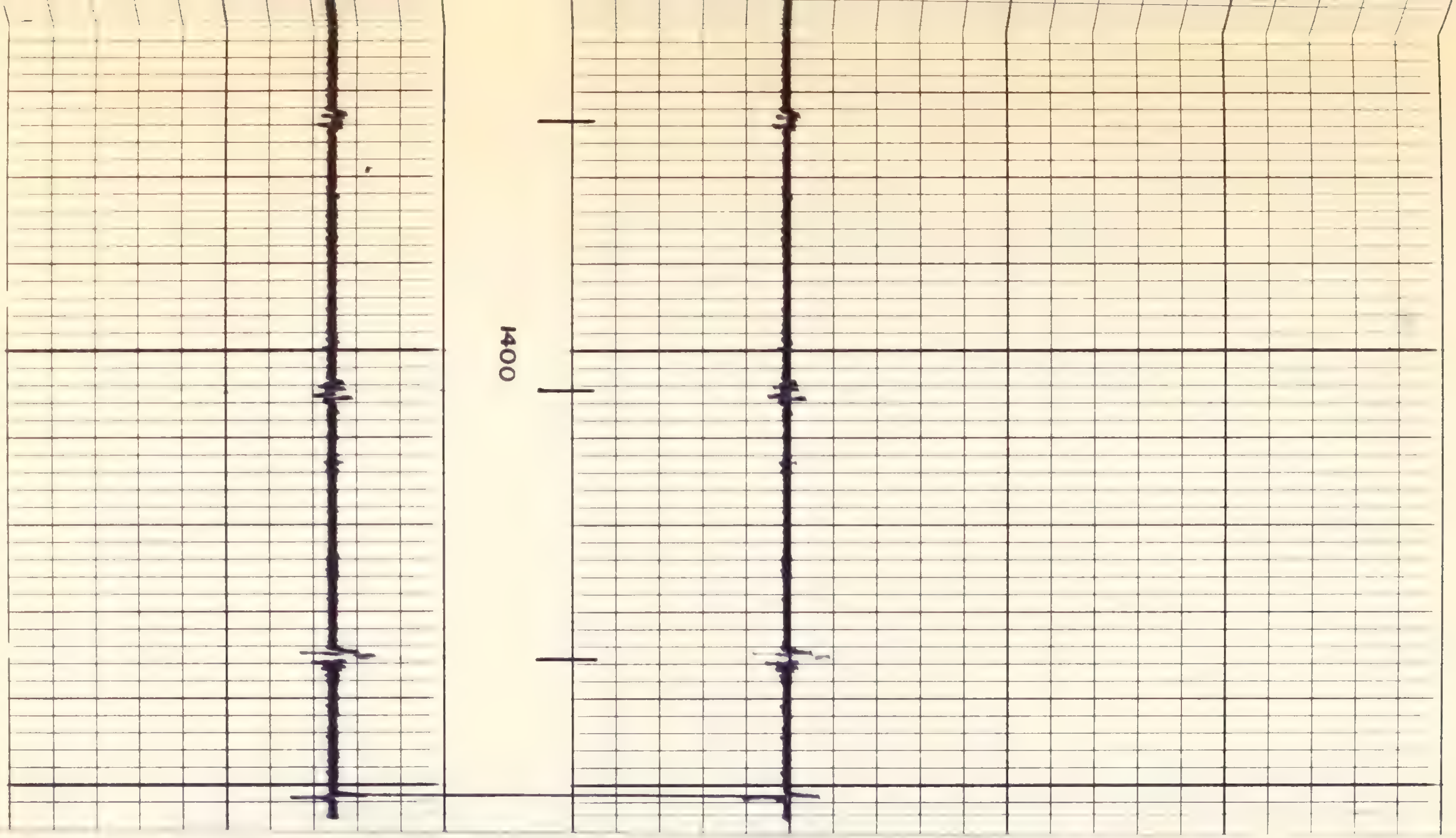

1000
1100


1200
ATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPER



1300



DEPTHS

CASING COLLAR LOG
AFTER PERFORATION

COMPANY ATLANTIC RICHFIELD COMPANY SCHL TD

COMPANY

SCHL. TD

WELL CB- NO. 4

DRLR TD 1459

FIELD

Elev:

KB ---

DF ----

COUNTY RIO BLANCO STATE COLORADO

GL 7054

Schlumberger

CEMENT BOND LOG

GR-CCL-VDL

COUNTY RIO BLANCO
Field or LOCATION
WELL CB NO.4
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL CB-NO.4

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION 1451' FSL- 960' FWL
API Serial No.

Sec. 17 Twp. 3S Rge. 96W

Other Services:
SP-HD

Permanent Datum: GROUND LEVEL, Elev. 7054
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7054

Date	9-24-74	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	1469	Max. Rec. Temp.	---- °F
Depth — Logger	1464	Est. Cement Top	1210
Btm. Log Interval	1456	Equip. | Location	3862 | VERNAL
Top Log Interval	1100	Recorded By	ST. AUBYN
Open Hole Size	4 3/4	Witnessed By	MR. ELLARD

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8			T & C	0	60
Prot. String						
Prod. String	2 3/8	4.7		T & C	0	1469
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			50 SKS	
Type of cement			CLASS "G"	
Additive			3% CAL-CHL	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE The well name, location and borehole reference data were furnished by the customer

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement	16:00 9-14-74	
Release pressure	13:00 9-24-74	
Start Cement Bond Log	14:00 9-24-74	
Finish Cement Bond Log		

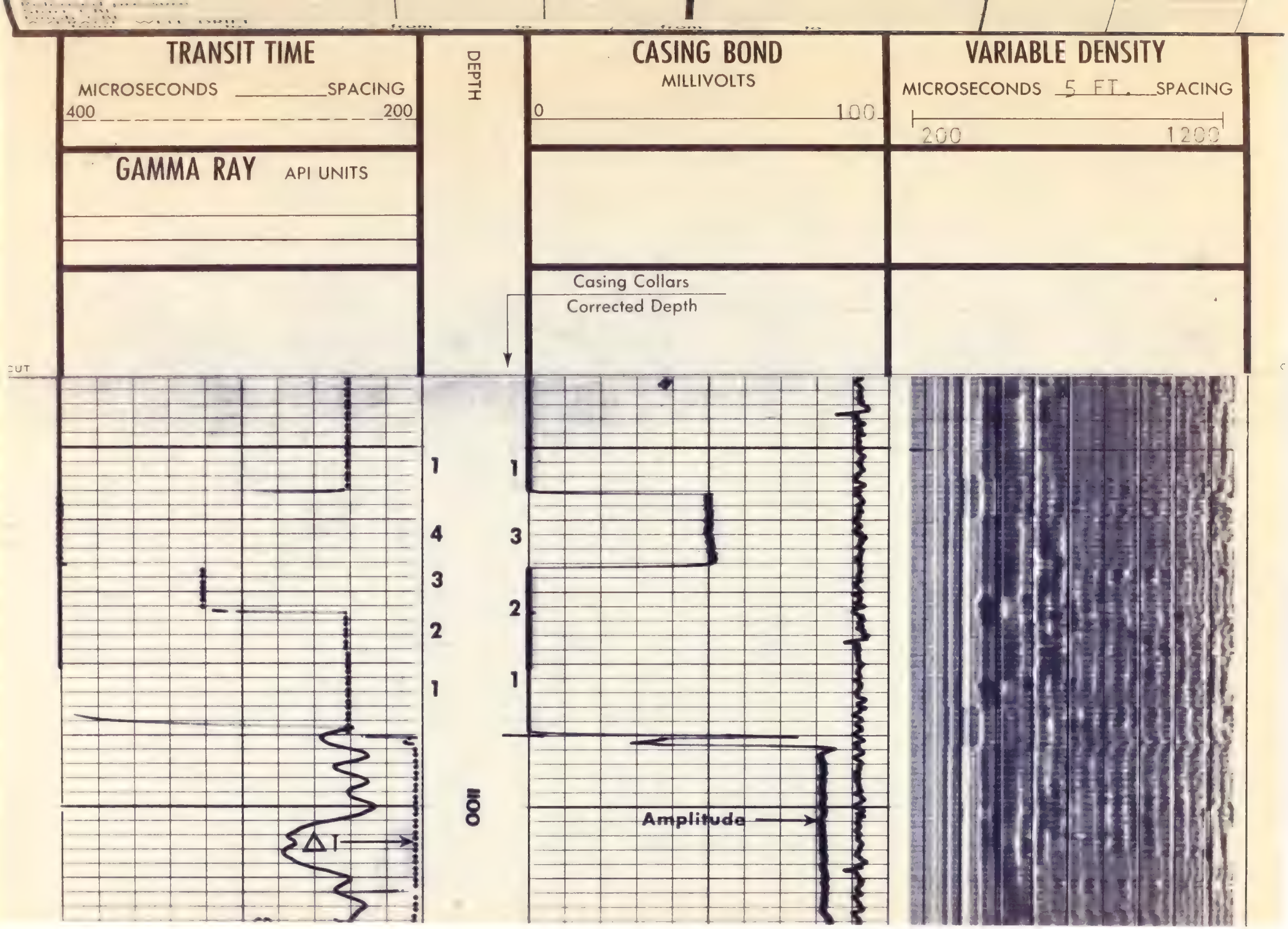
REMARKS
Service Order No. 43353
Csg. Collars Recorded 19 ft. DEEP

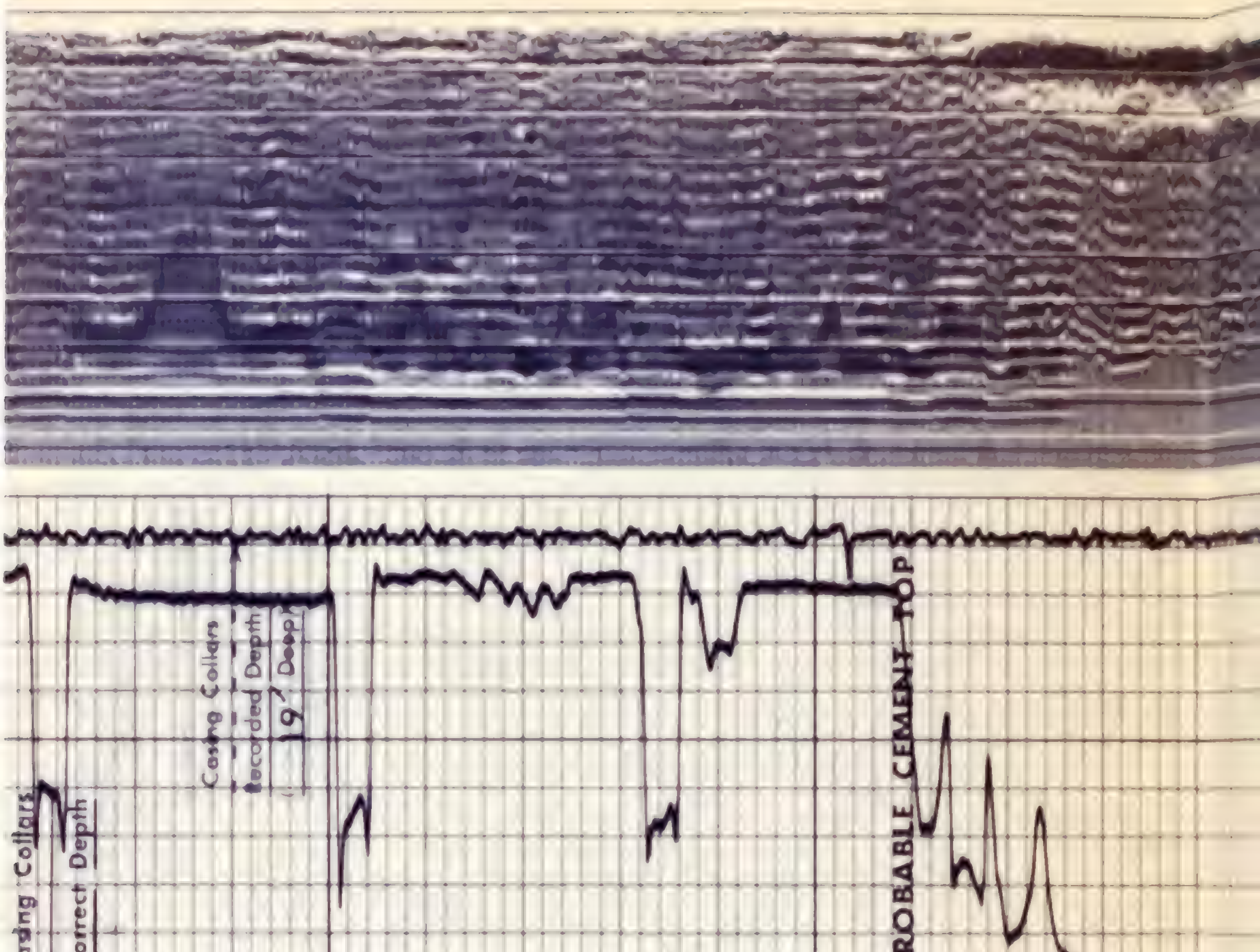
Preceding fluid ________ Volume ________ bbls.
Cement pumped ________ bbls./minute

Pipe reciprocated during Pumping: Yes ________ No ________
Pipe reciprocated after plug down: Yes ________ min., No ________

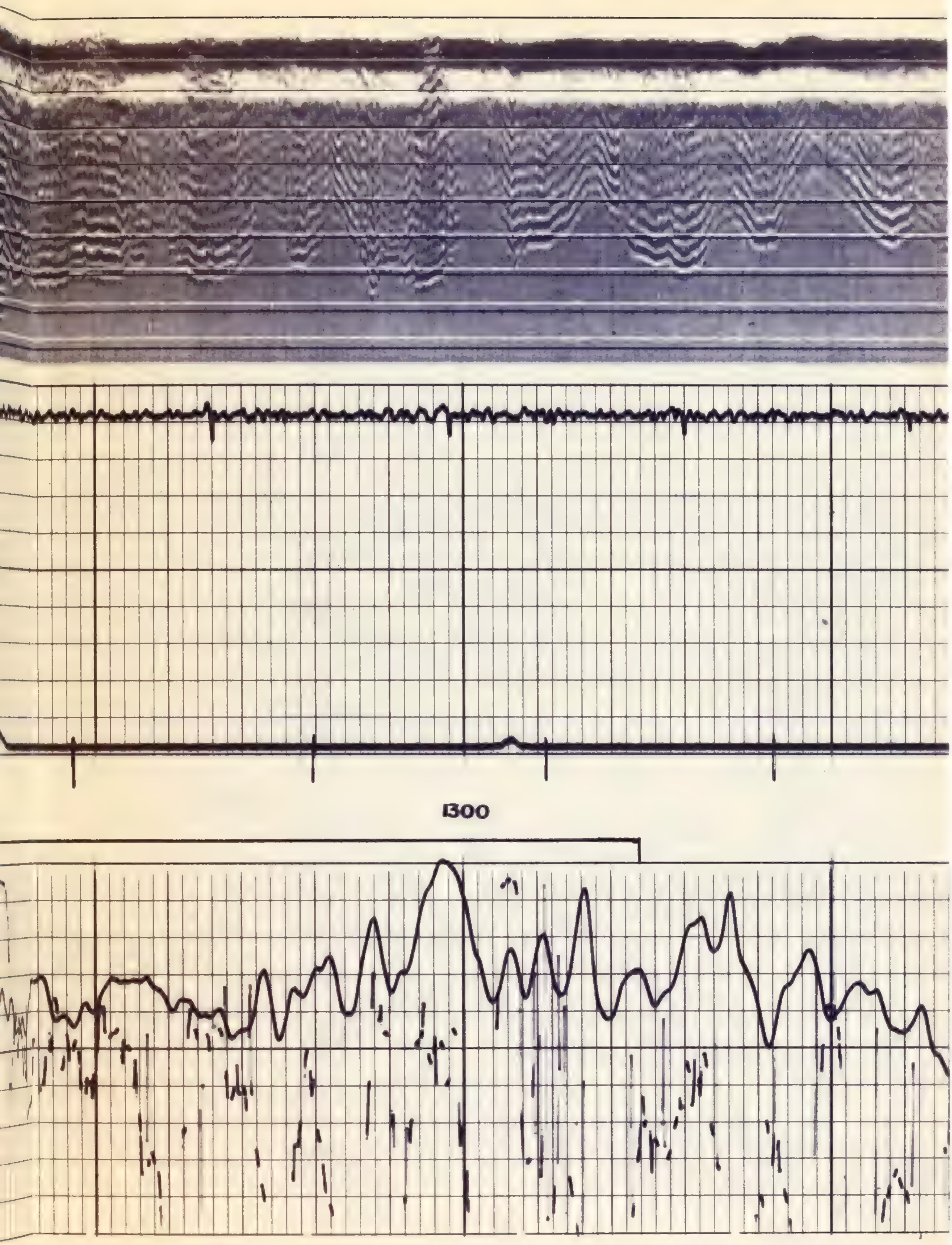
SQUEEZE JOB DETAIL			EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Squeeze number	1	2	Sonic Panel No.	SLP-FH#629	
Date			Sonic Cart No.	SHH-AHA#15	
Depth interval			Sonic Sonde No.	SLT-JC#54	
Type cement			CRP No.	14	
Volume of cement			Mem Panel No.	MMP-B#201	
Additive			GR Panel No.	GNP-D#556	
			GR Cart No.	SHH-AFA#51	
Retarder			Centralizer: Type	CME-V CAL-4J	
			No.	CMEW	
Weight of slurry			To Level (MV)	100	
Preceding fluid			Cart. Gain	1/20	
			CRP Intensity	.16	
Breakdown pressure			R9G Intensity	75	
Max. pressure-stage 1					
" " " 2					
" " " 3			Logging Speed	30 FPM	
Final maximum pressure			Time Constant		
Started pumping cement					
Released pressure					
Start CBL					
Finish CBL					

AVERAGE WELL DRIFT:
° from to ; ° from to ; ° from to


TRANSIT TIME
MICROSECONDS
SPACING
400
200
GAMMA RAY
API UNITS
DEPTH
CASING BOND
MILLIVOLTS
0
100
VARIABLE DENSITY
MICROSECONDS 5 FT. SPACING
200
1200
Casing Collars
Corrected Depth
CUT
1
4
3
2
1
1
3
2
1
1100
ΔT
Amplitude



Casing Collars
Correct Depth
Casing Collars
Recorded Depth
19' Deep
PROBABLE CEMENT TOP
1200
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" EXPENDIBLE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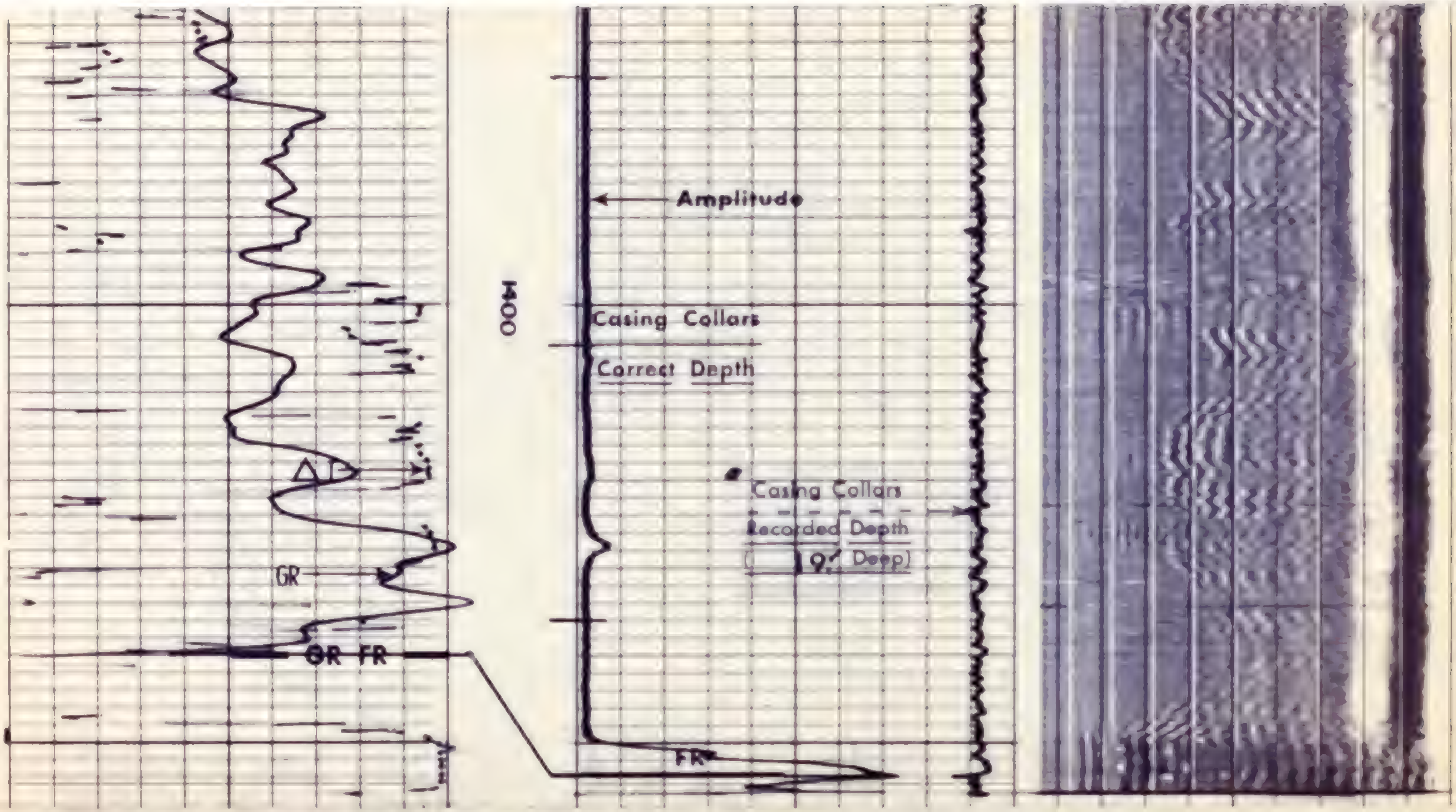
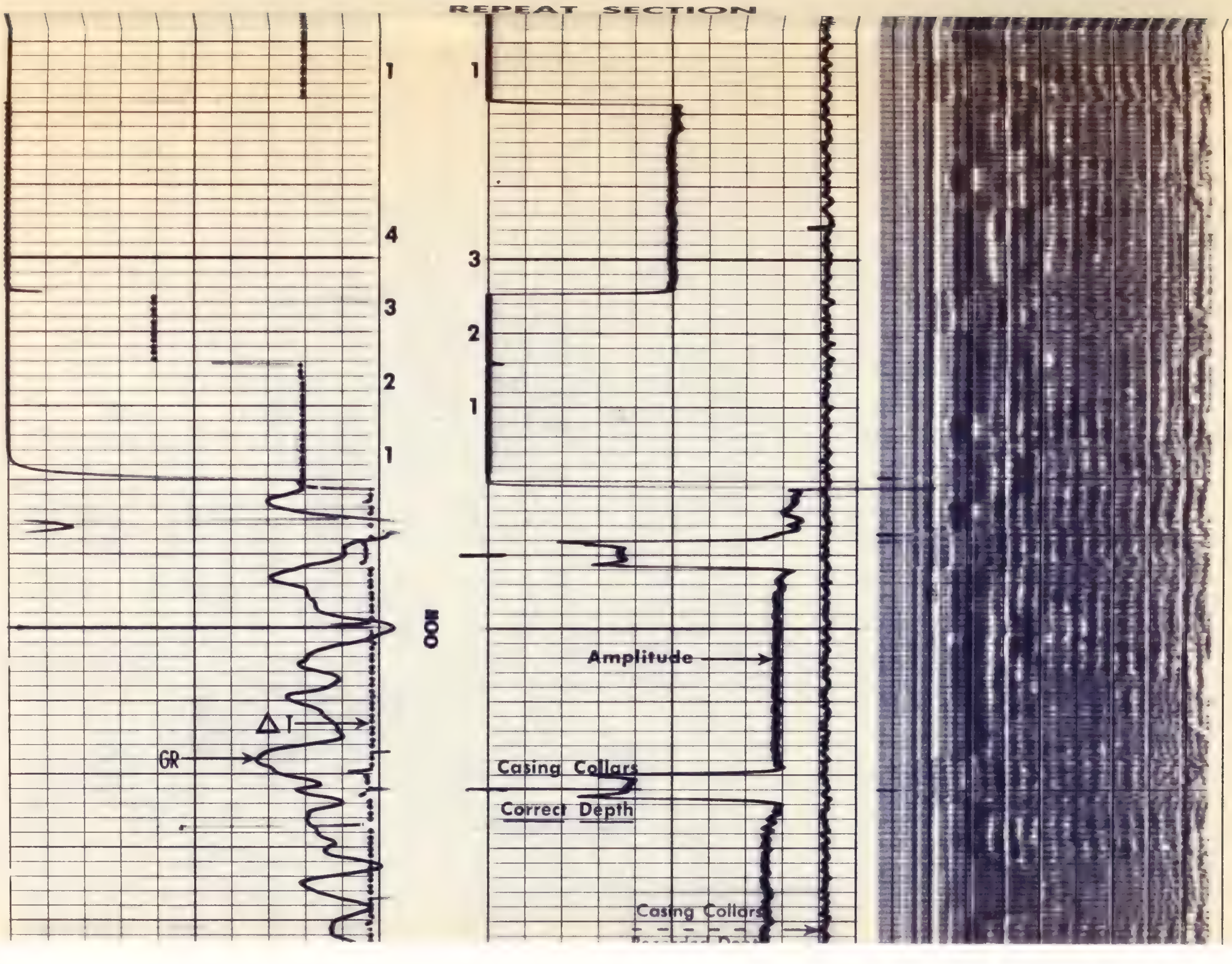
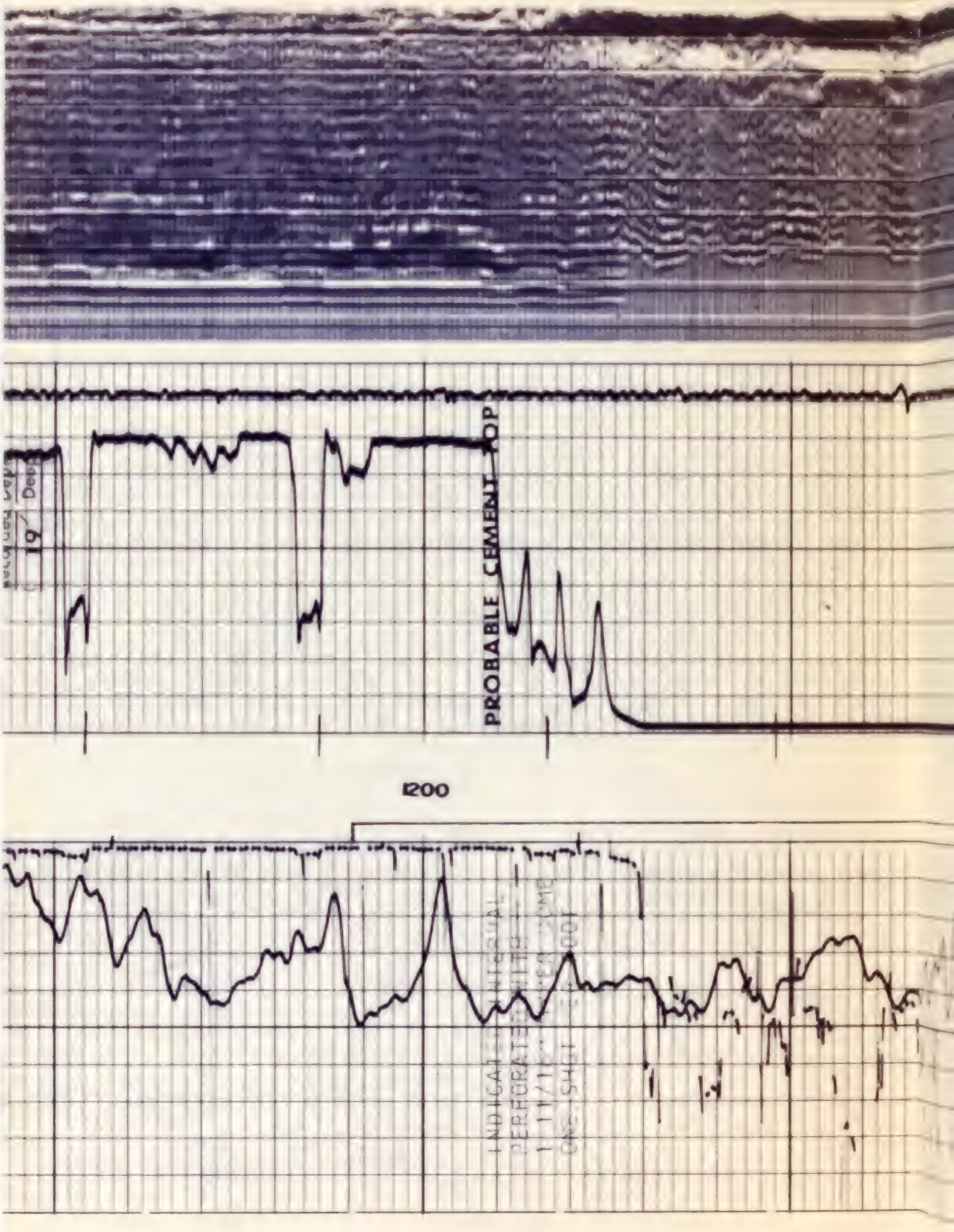
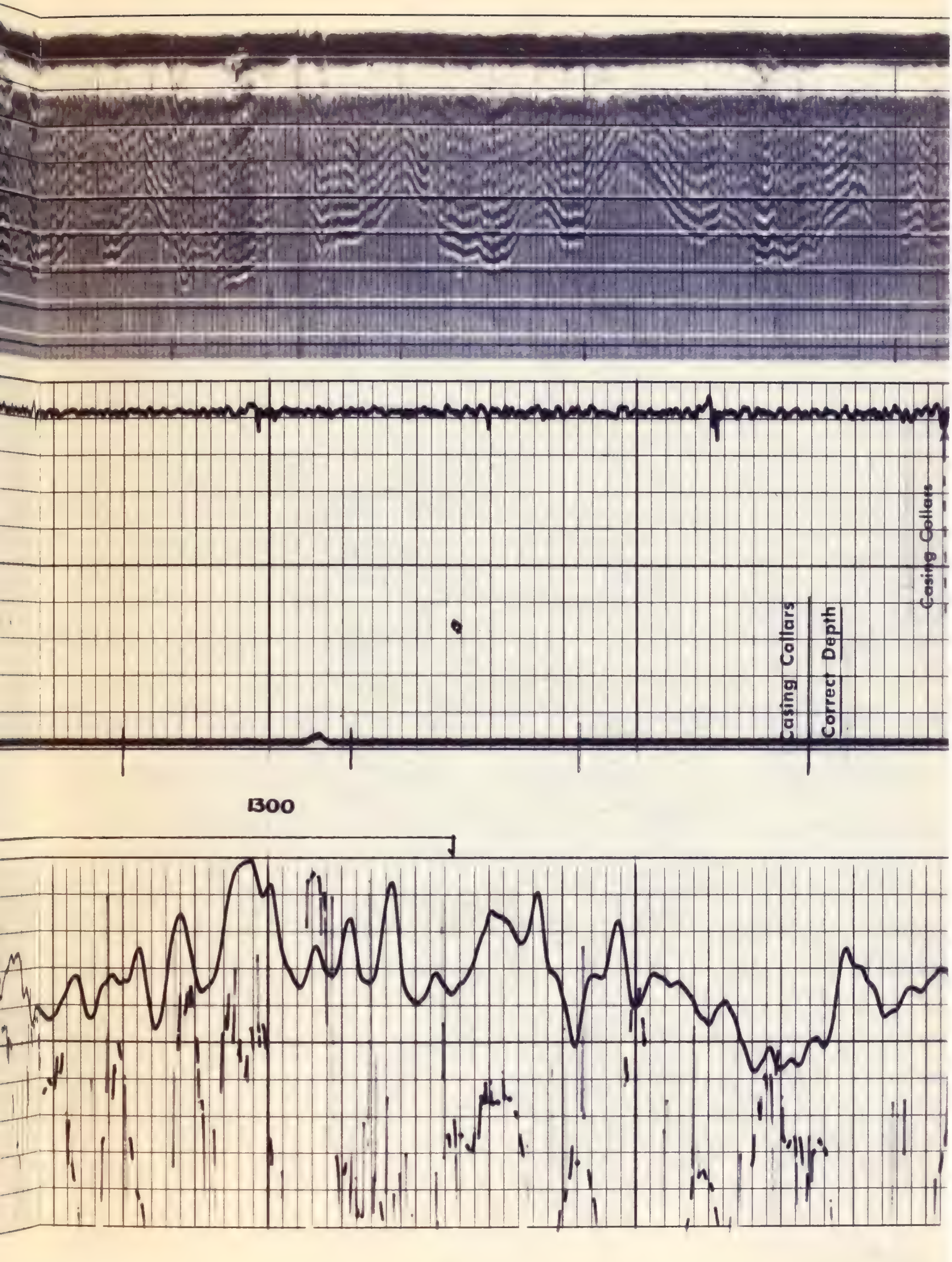
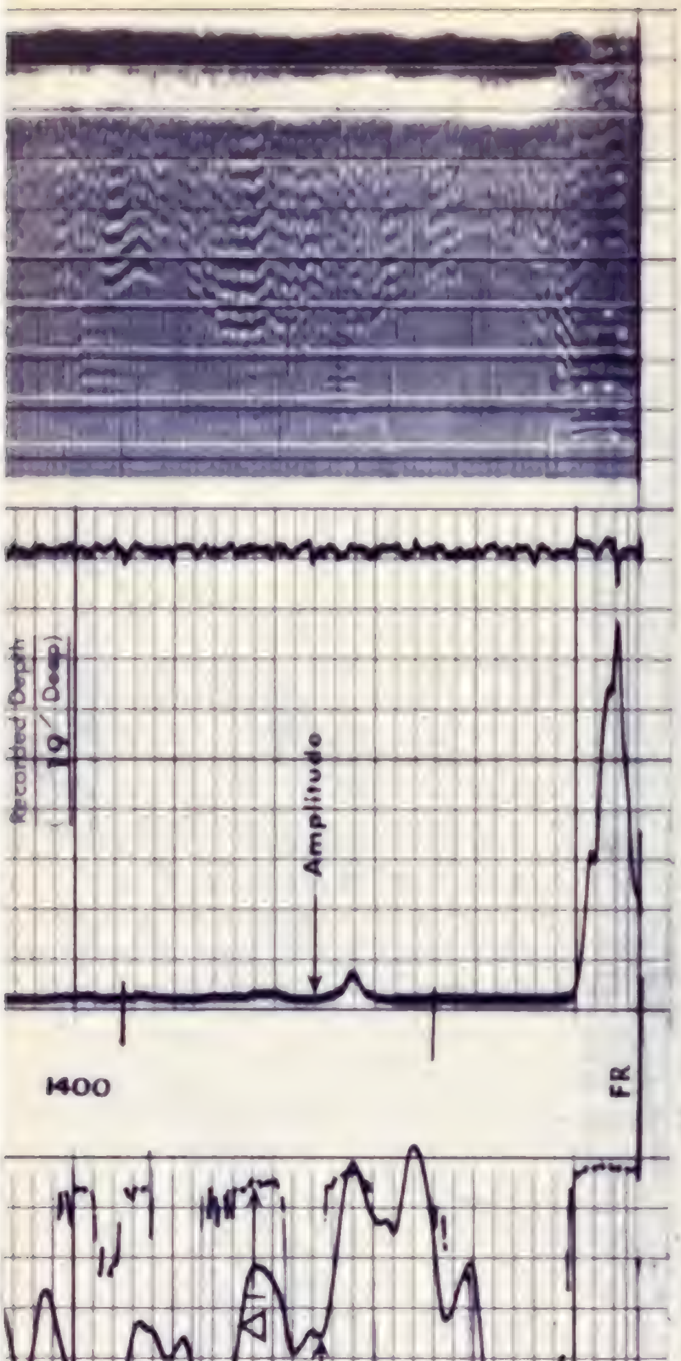


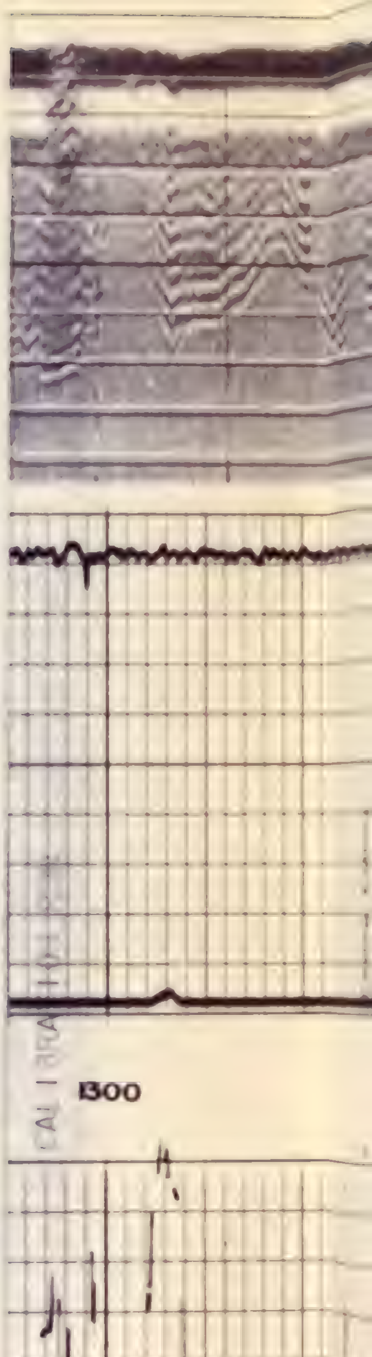
REPEAT SECTION

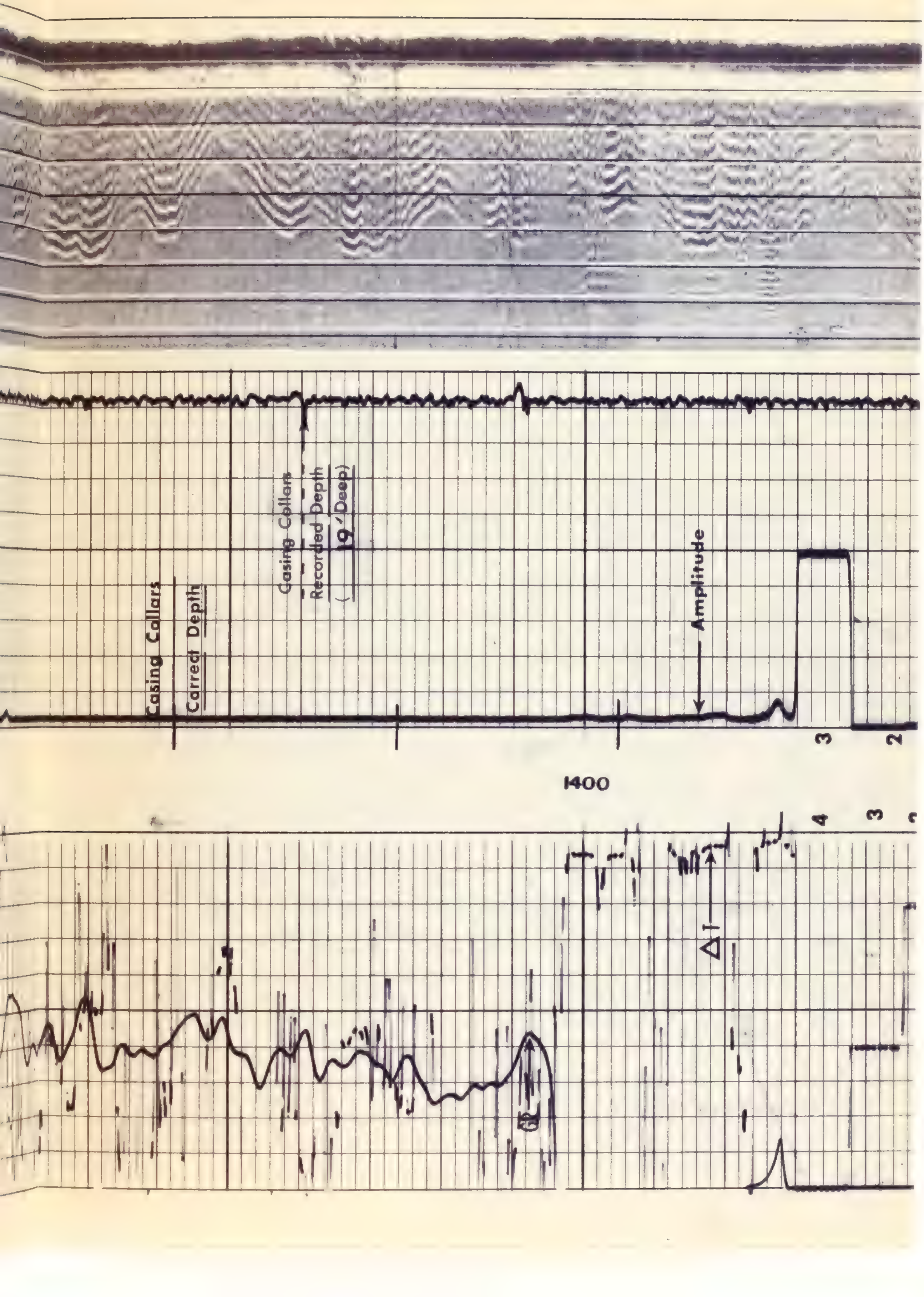

REPEAT SECTION
1
4
3
2
1
1
3
2
1
1100
Amplitude
ΔT
GR
Casing Collars
Correct Depth
Casing Collars

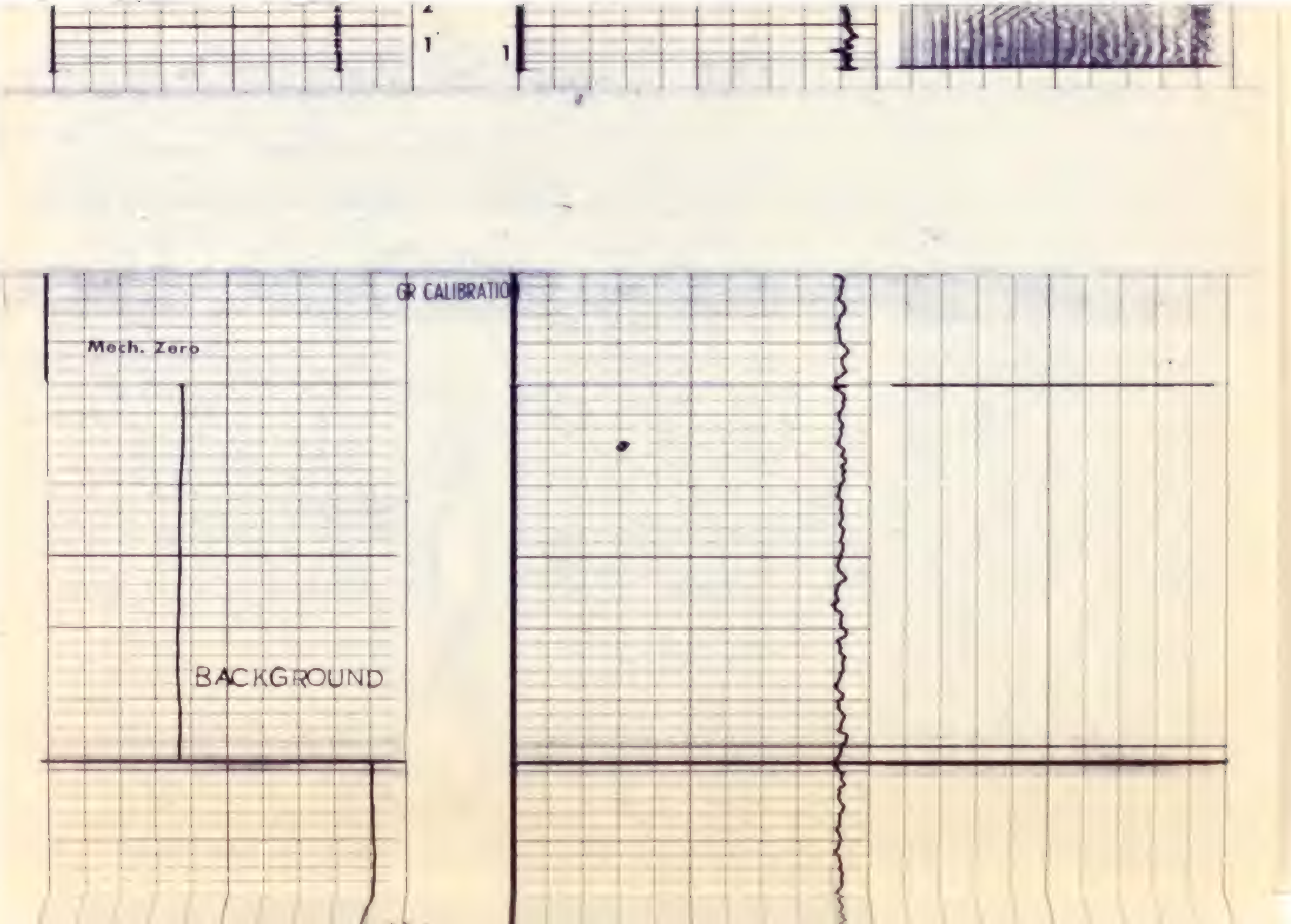

19
PROBABLE CEMENT TOP
1200
INDICATES INTERVAL
PERFORATED WITH
SHOT

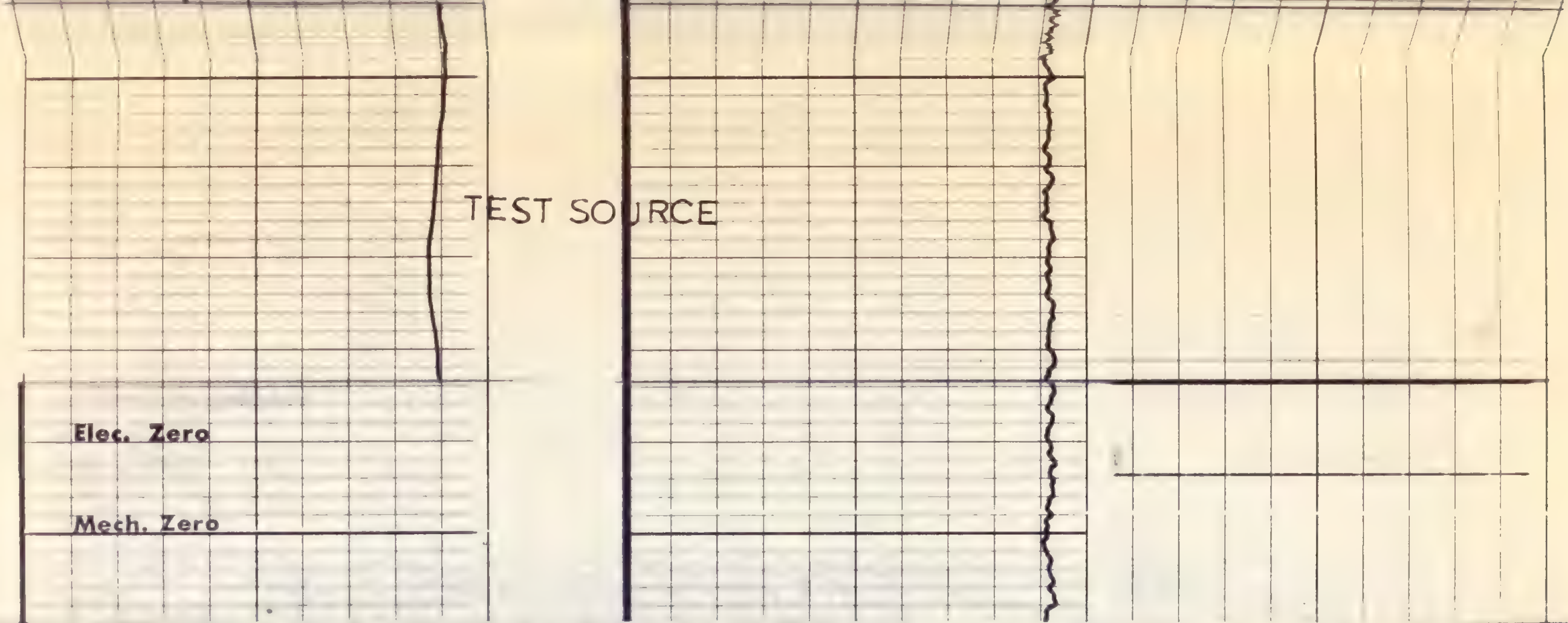

Casing Collars
Correct Depth
Casing Collars
1300


Recorded Depth
19' Deep
Amplitude
1400
FR
I
R


CALIBRATION
1300


Casing Callars
Carrect Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
1400
3
2
4
3
ΔT


1
1
GR CALIBRATIO
Mech. Zero
BACKGROUND



Casing Collars
Corrected Depth

DEPTH

TRANSIT TIME

MICROSECONDS ______ SPACING

400 - - - - - - - - - - - - 200

GAMMA RAY API UNITS

CASING BOND

MILLIVOLTS

0 ______ 100

VARIABLE DENSITY

MICROSECONDS 5 FT. SPACING

200 ______ 1200

COMPANY ATLANTIC RICHFIELD COMPANY

WELL C[illegible]-NO.4

SCHL. FR 1456
SCHL. TD 1464
DRLR TD 1469

FIELD

COUNTY RIO BLANCO STATE COLORADO

Elev:
KB ----
DF ----
GL 7354

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1	MECHANICAL ZERO	MECHANICAL ZERO
2	240 μ sec	ELECTRICAL ZERO
3	320 μ sec	CALIBRATE
4.	400 μ sec	

Schlumberger

PERFORATING DEPTH CONTROL

COUNTY RI[illegible]
FIELD or LOCATION SOR[illegible]CH
WELL S.G. No. 1
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.1

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location
1940' FEL & 1914' FSL
Sec. Twp. 3S Rge. 97W

Other Services:
[illegible]

Permanent Datum: GROUND LEVEL ; Elev.: 64[illegible]8
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L.

Date	4/11/75		
Run No.	1 ONE [illegible]		
Type Log	GAMMA RAY		
Depth — Driller	2519---13[illegible]4		
Depth — Logger	2400---1[illegible]40		
Bottom logged interval	[illegible]4[illegible]---1[illegible]		
Top logged interval	[illegible]00--- 6[illegible]		
Type fluid in hole	WATER		
Salinity, PPM Cl.	------		
Density	------		
Level	FULL		
Max. rec. temp., deg F.	------		
Operating rig time	THREE HOURS		
Recorded By	[illegible]. AU[illegible]		
Witnessed By	[illegible]. [illegible] TAIT		

BORE-HOLE RECORD

Bit Size	From	To
[illegible]	SURF	15[illegible]
		11[illegible]
		[illegible]

CASING RECORD

Size	Wgt.	From	To
[illegible] 5/8		SURF	1[illegible]
[illegible]/8	4.7	SURF	[illegible]
[illegible]/8	4.7	SURF	1

SWS 672-G

FOLD HERE

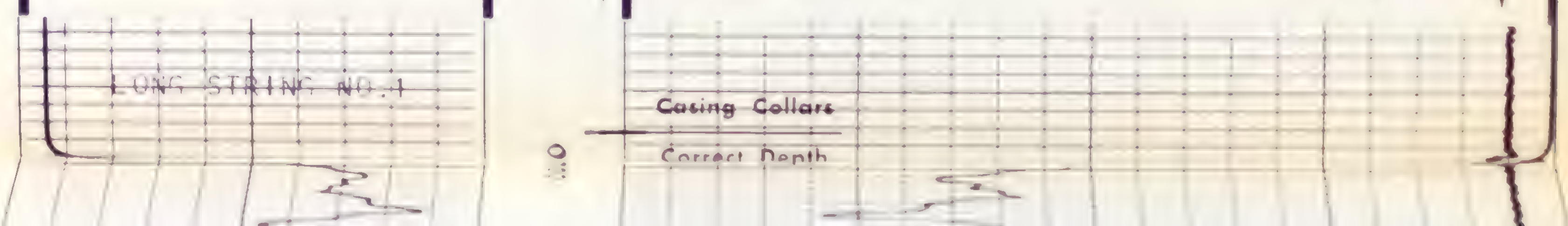
The well name, location and borehole reference data were furnished by the customer

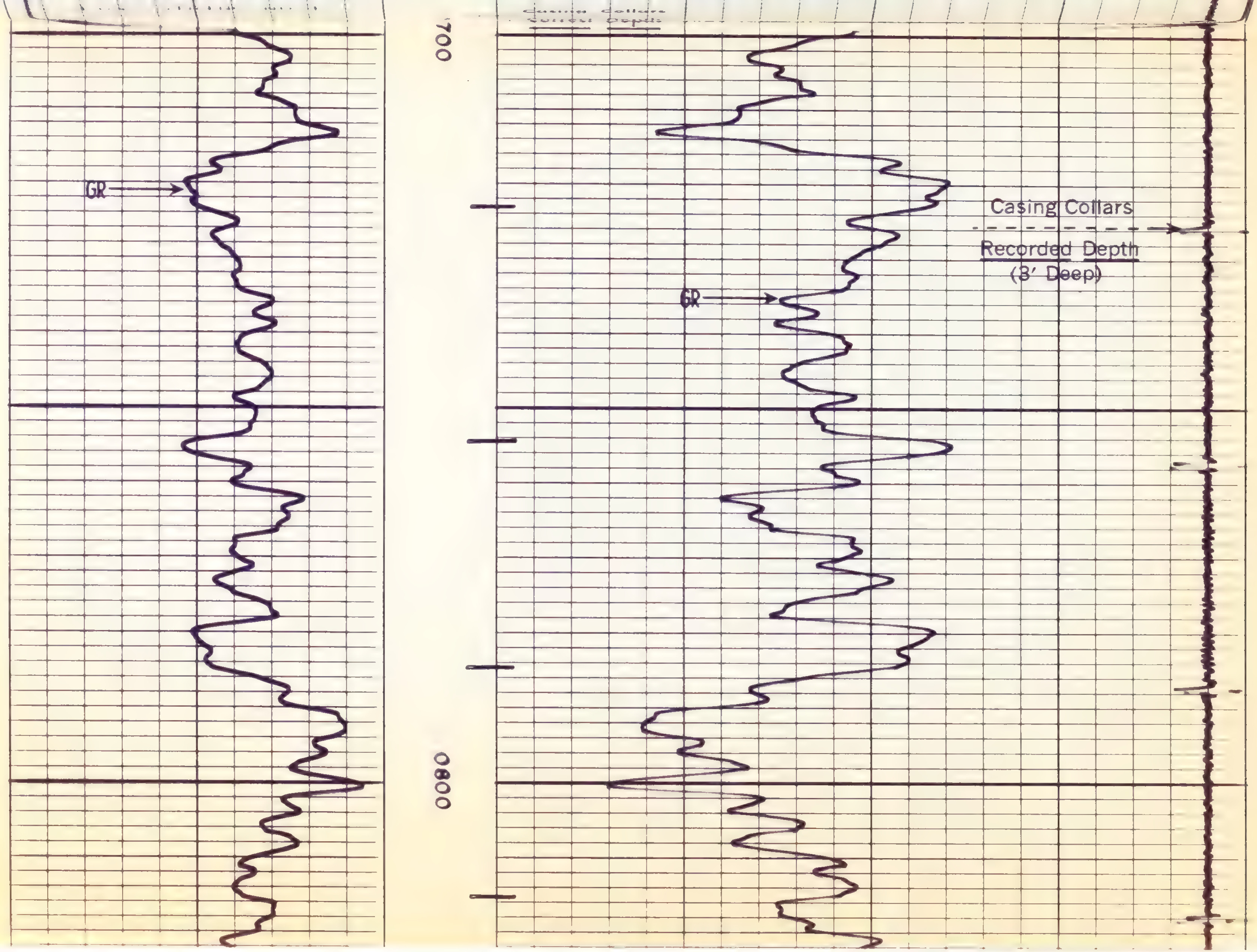
EQUIPMENT DATA

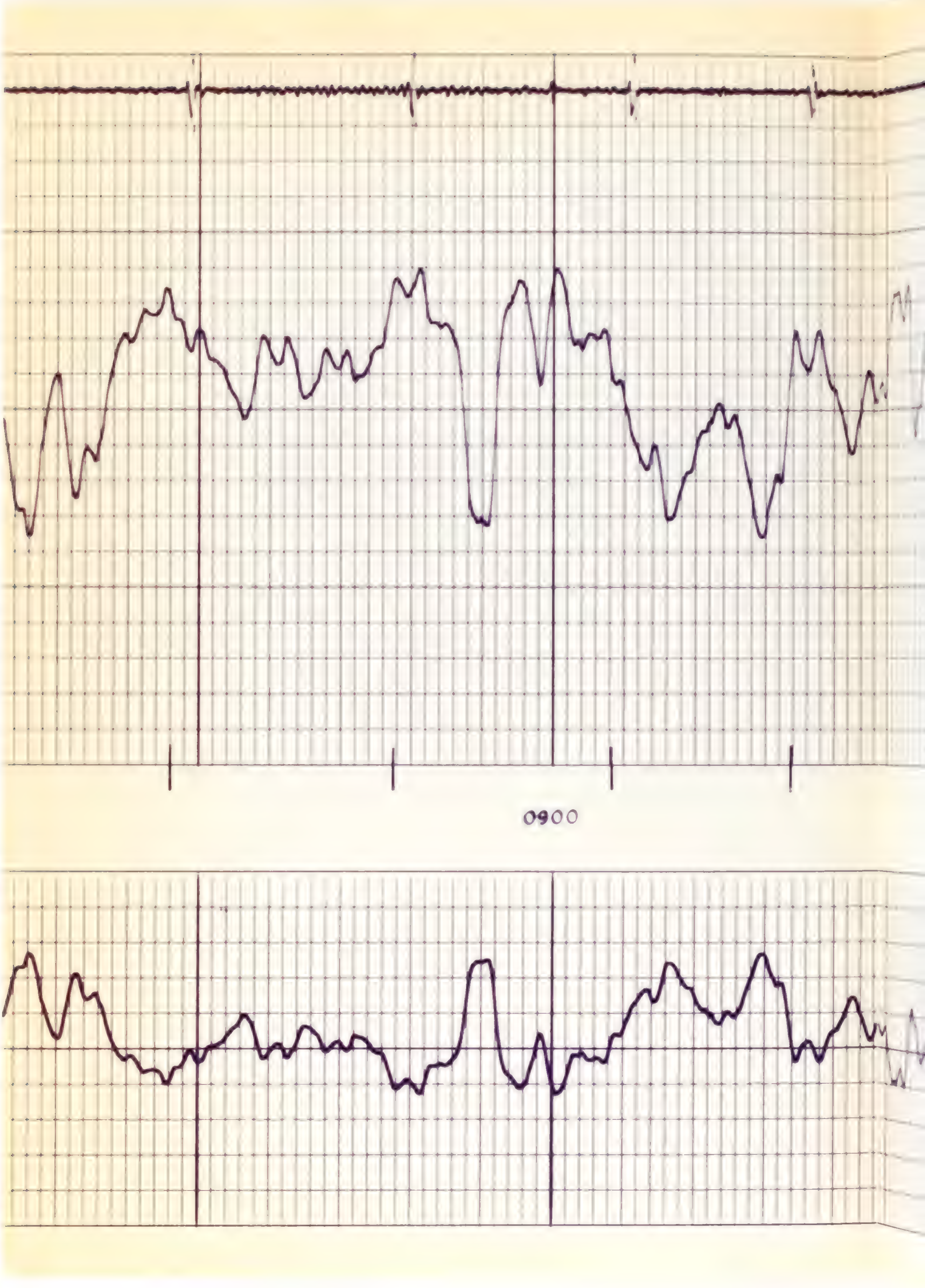
	Gamma Ray
Run No.	[illegible]
Tool Model No.	[illegible]
Diameter	1 11/16
Det'r Model No.	[illegible]
Type	[illegible]
Length	
S. O. No.	
	General
Hoist Truck No.	[illegible]
Inst. Truck No.	[illegible]
Tool Serial No.	[illegible] 1
Location	[illegible]

Remarks: Casing Collars recorded [illegible] ft. DEEP . Corrected collar depths are shown in the depth track

GAMMA RAY RADIOACTIVITY INCREASES →	DEPTHS	GAMMA RAY ← RADIOACTIVITY INCREASES
		Casing Collars Correct Depth ↓ — Recorded Casing Collars ↓




Casing Collars
Correct Depth
700
GR
Casing Collars
Recorded Depth
(3' Deep)
GR
0800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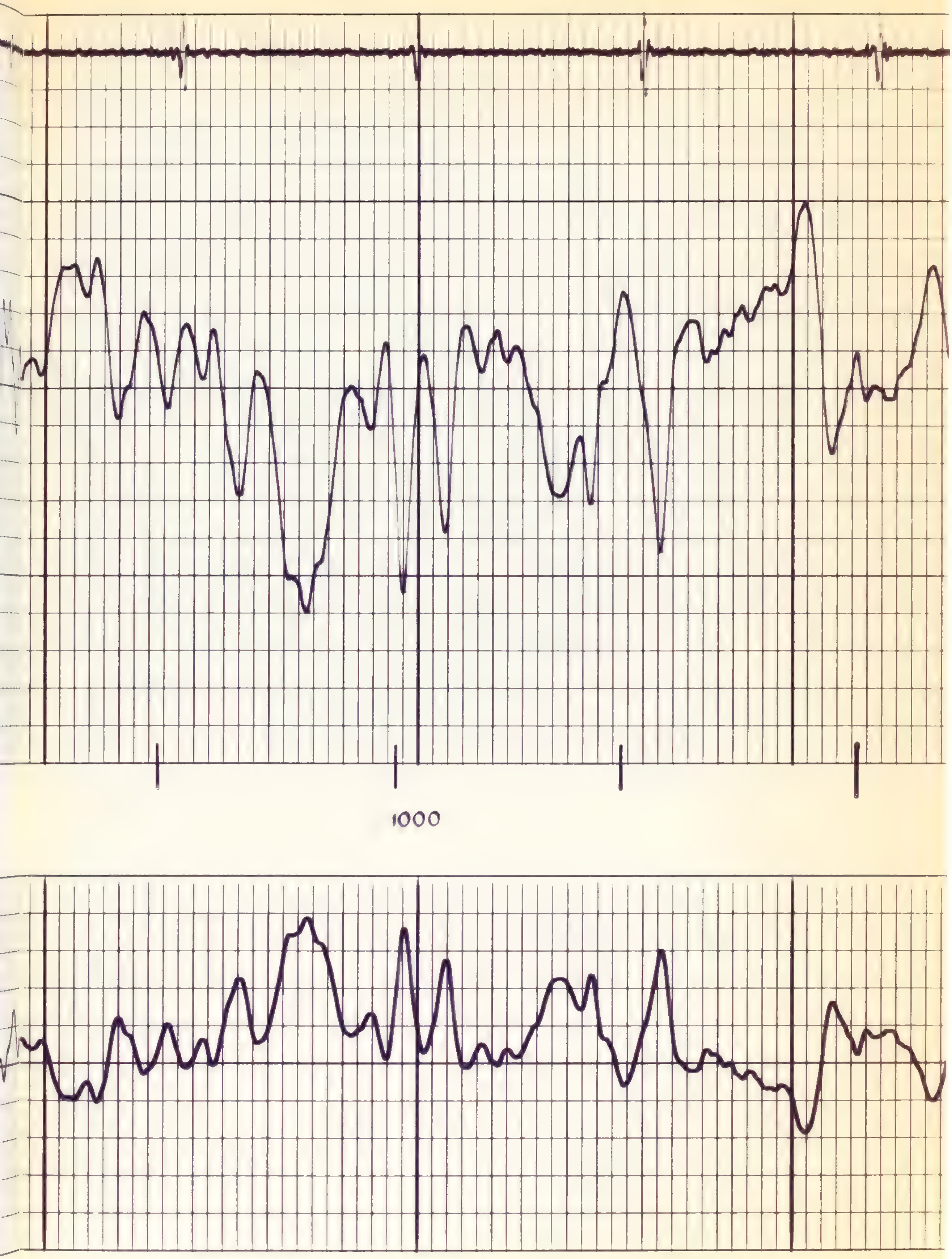
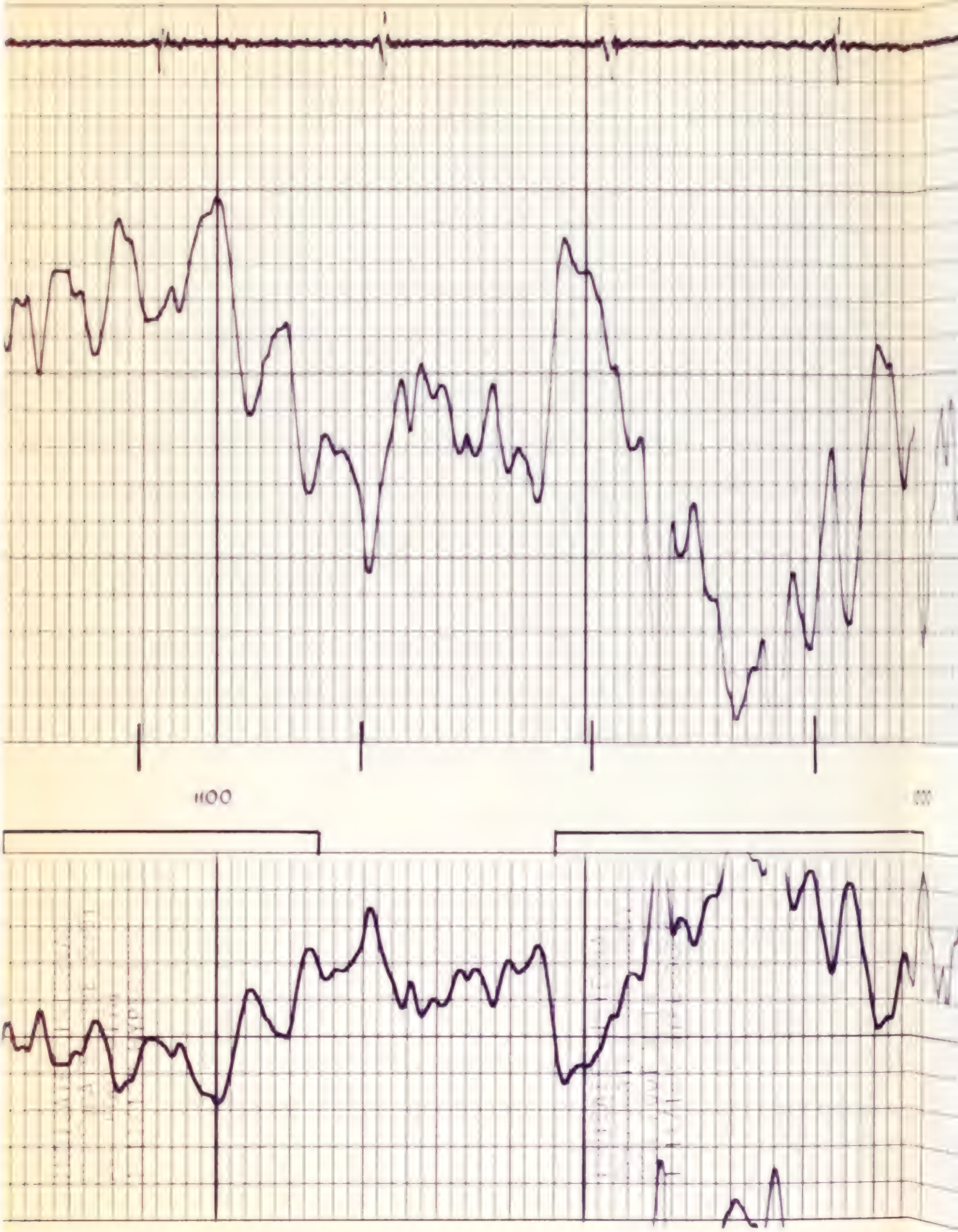


1000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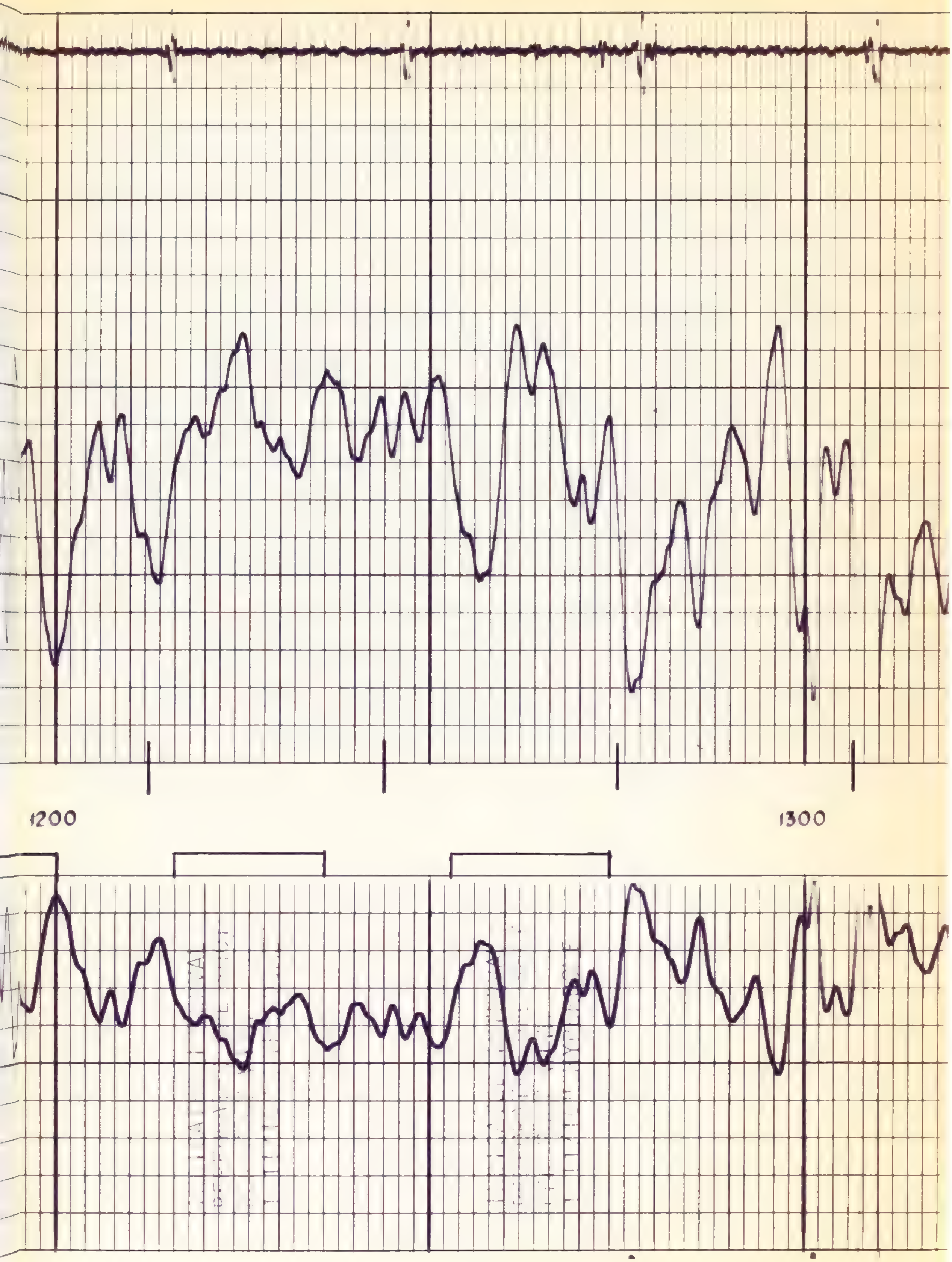
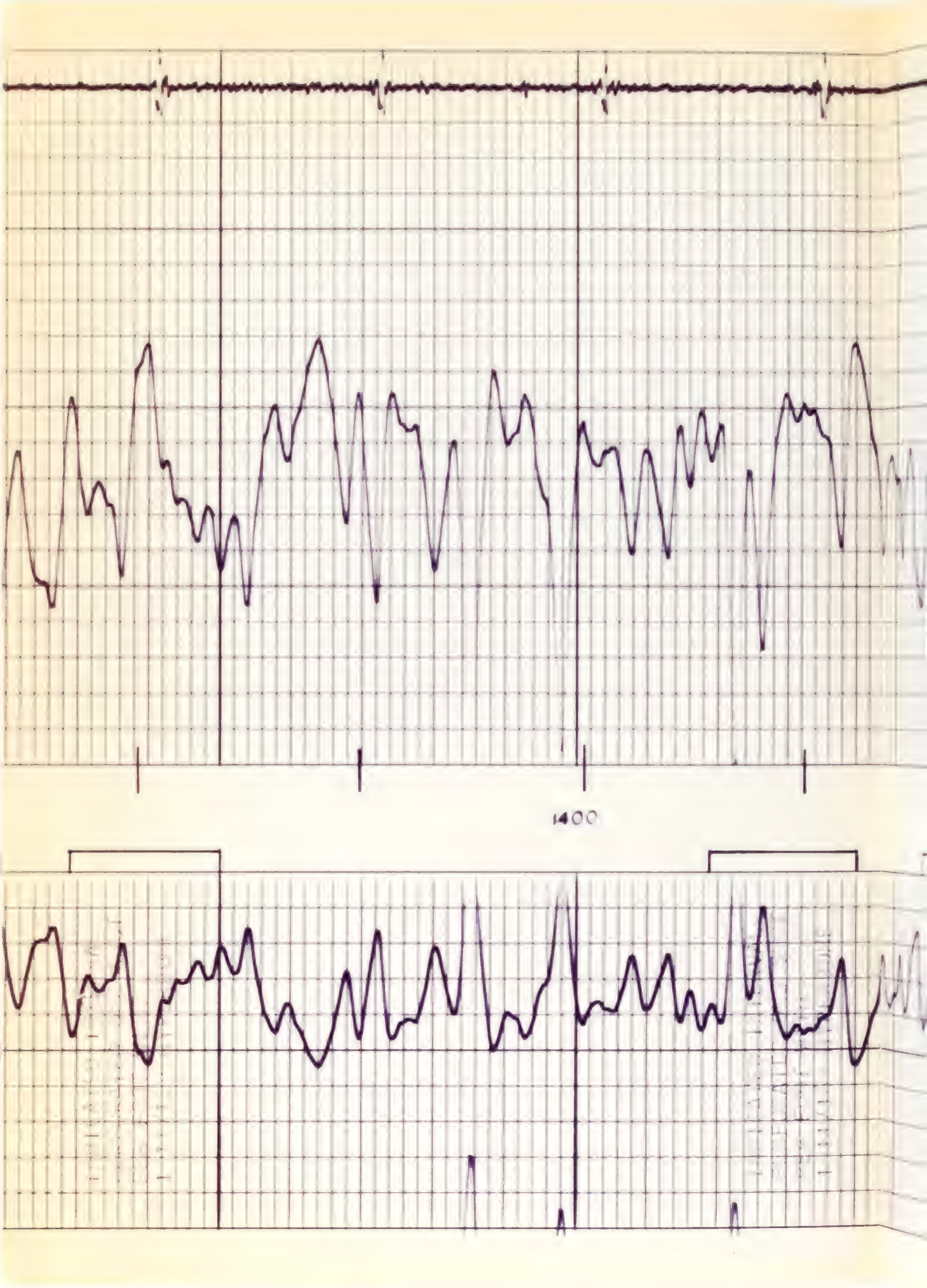
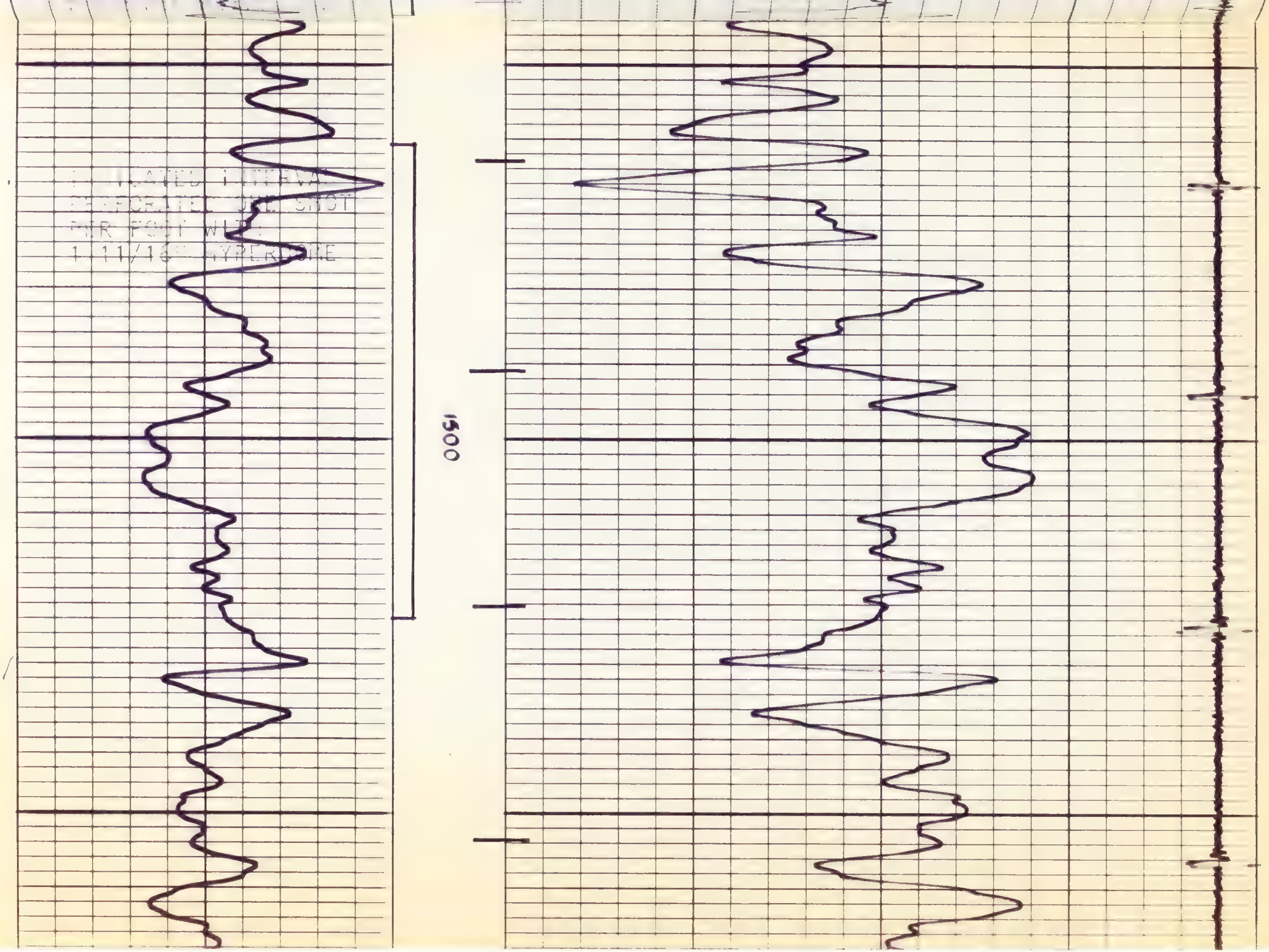
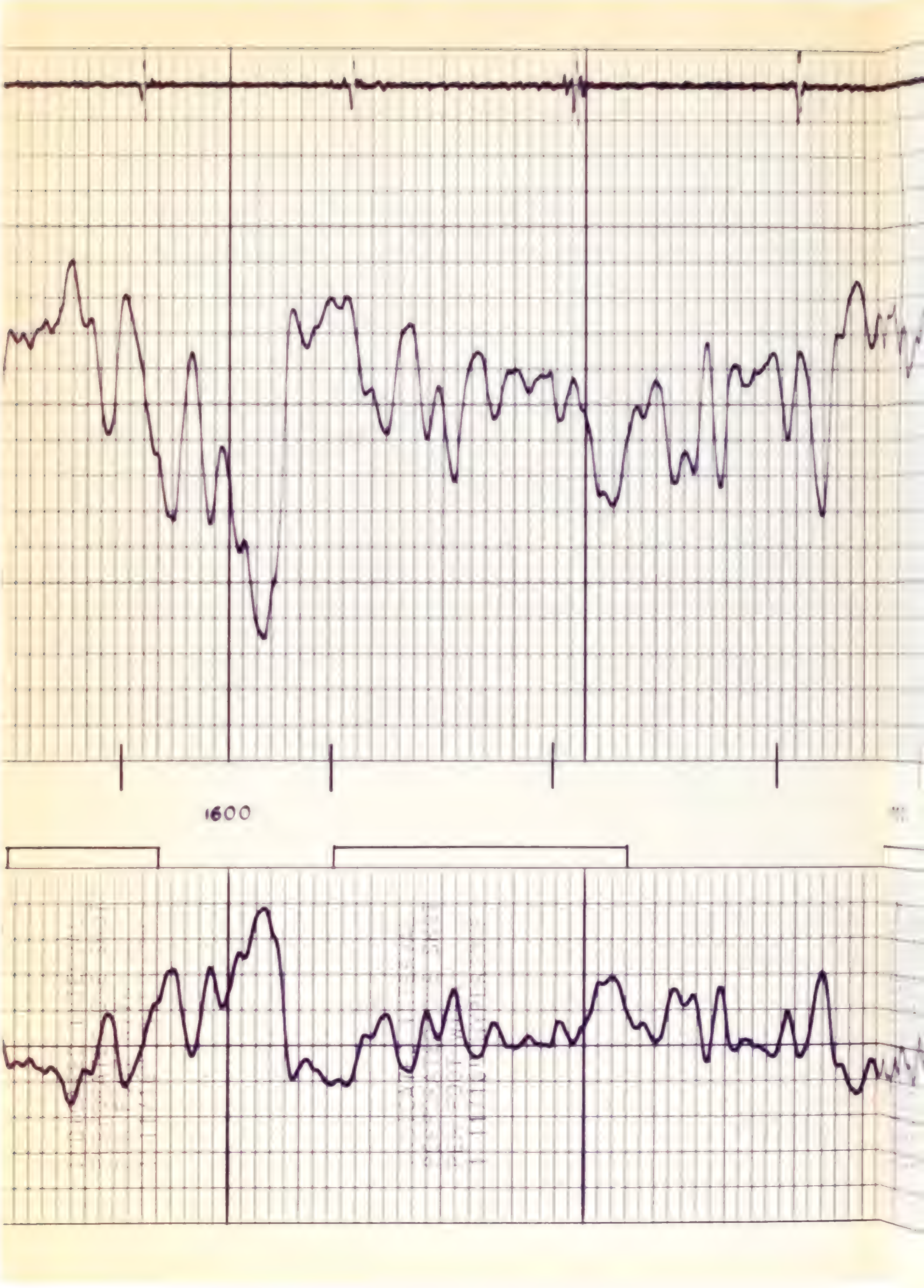
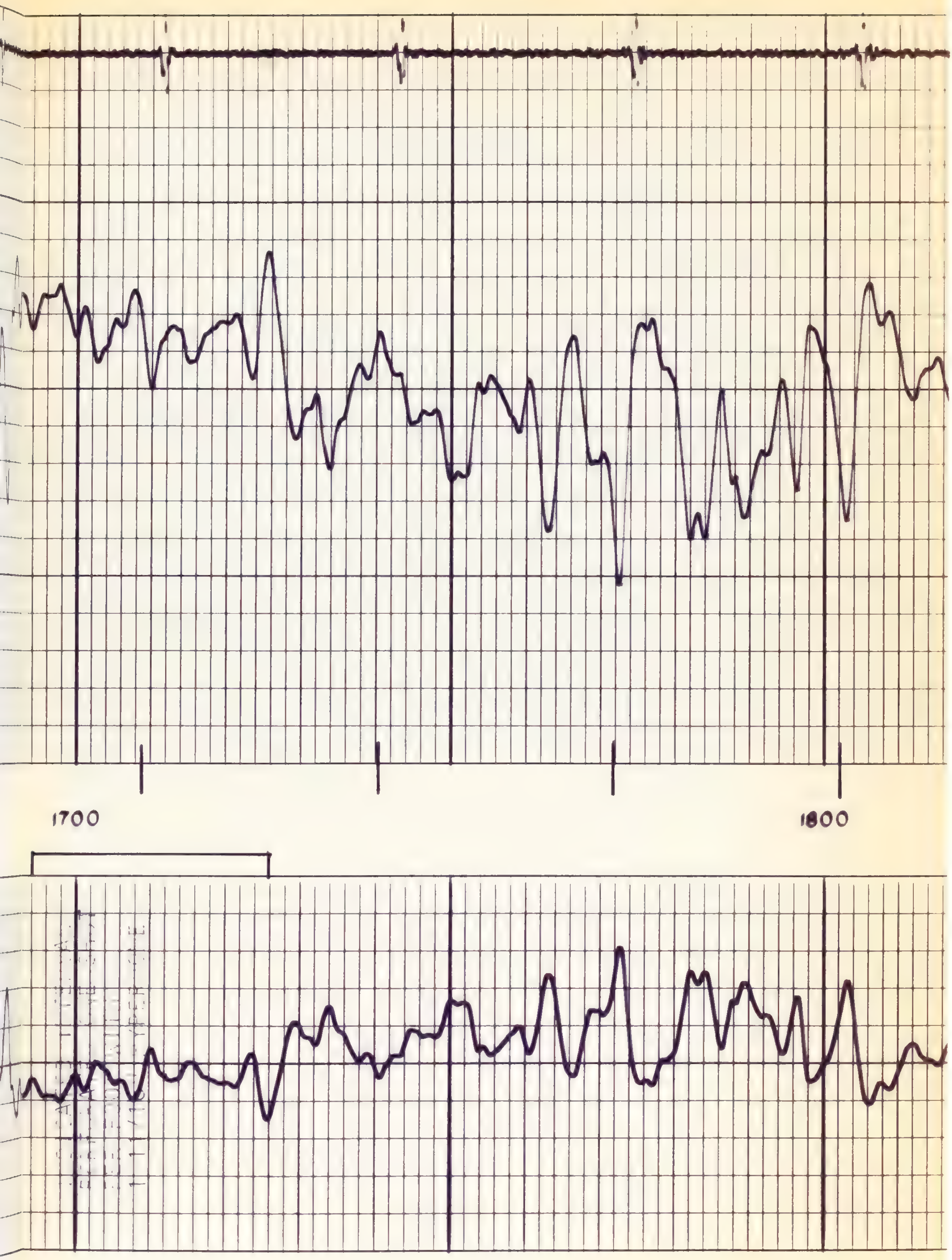
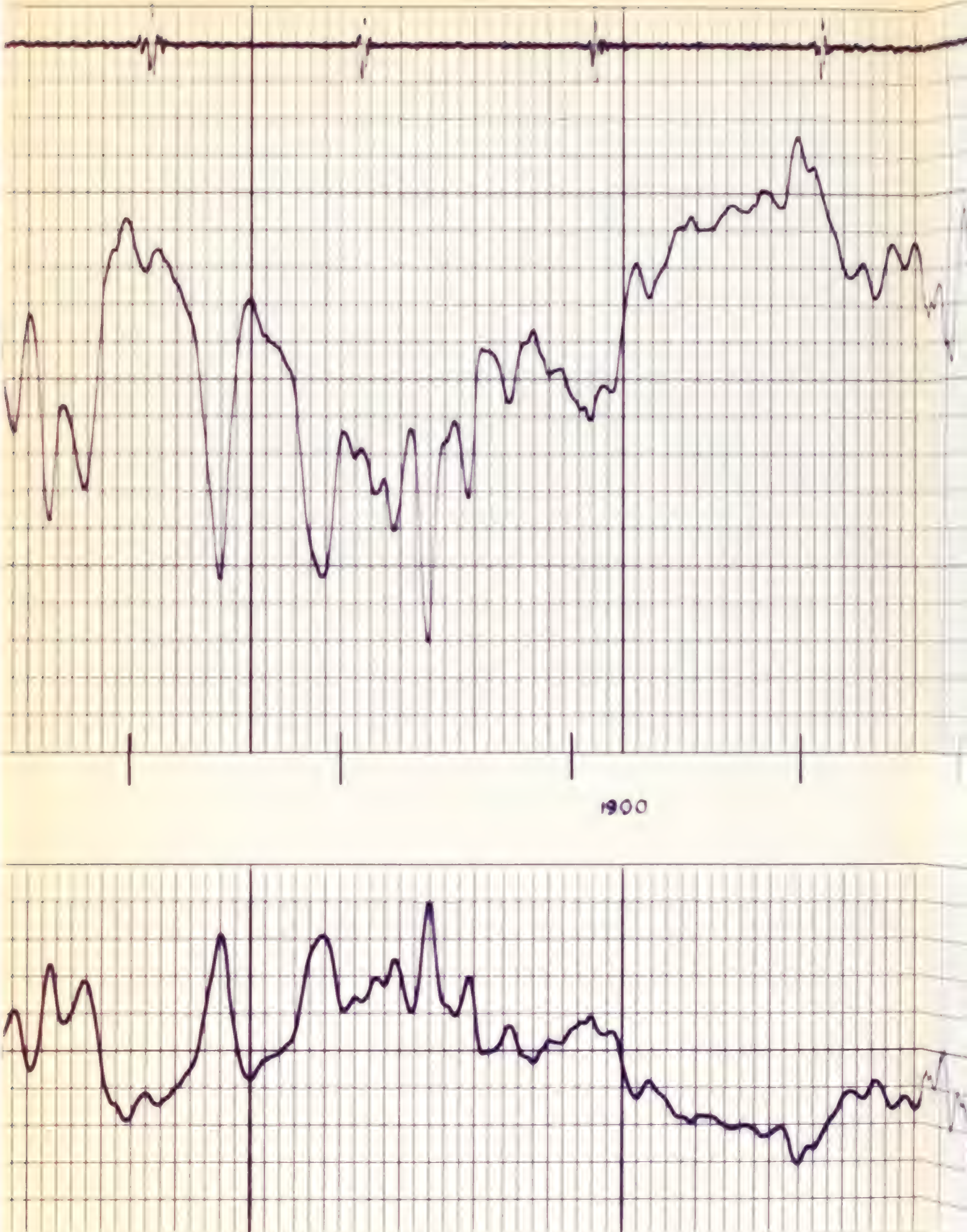

1200
1300


1400


ISOLATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1-11/16" HYPERDOME
1500


1600


1700
1800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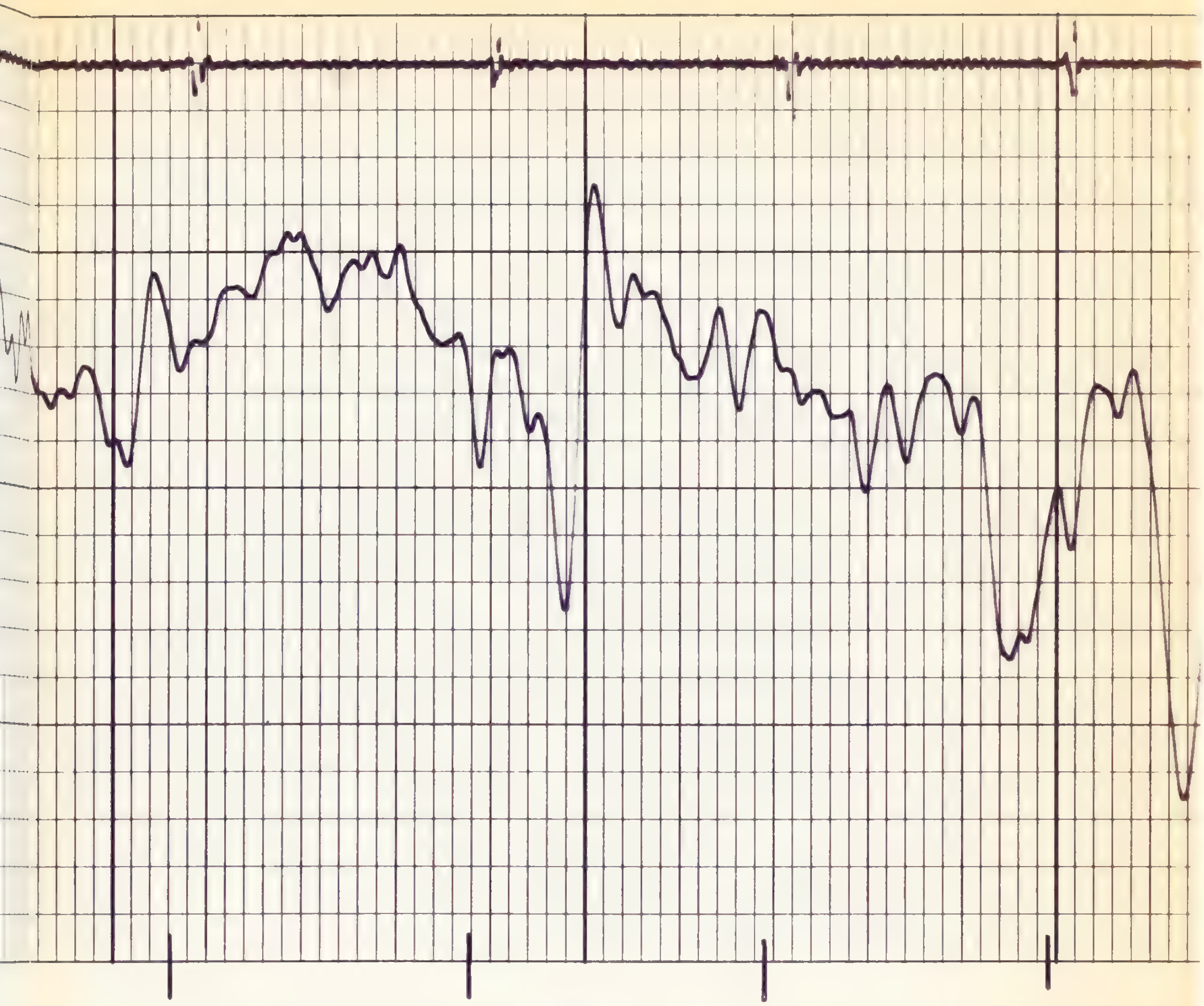
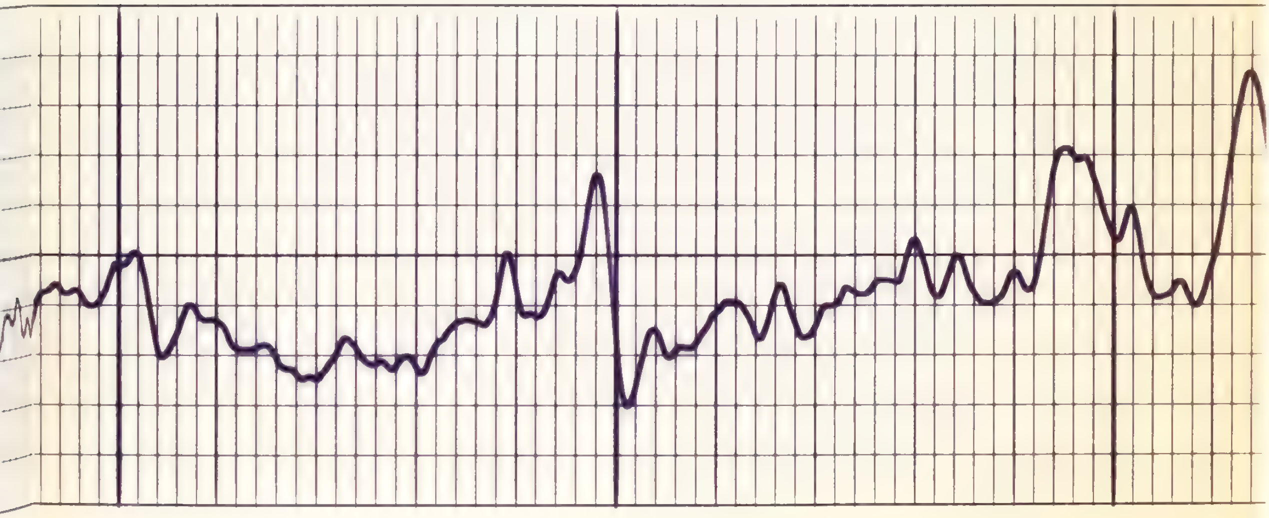
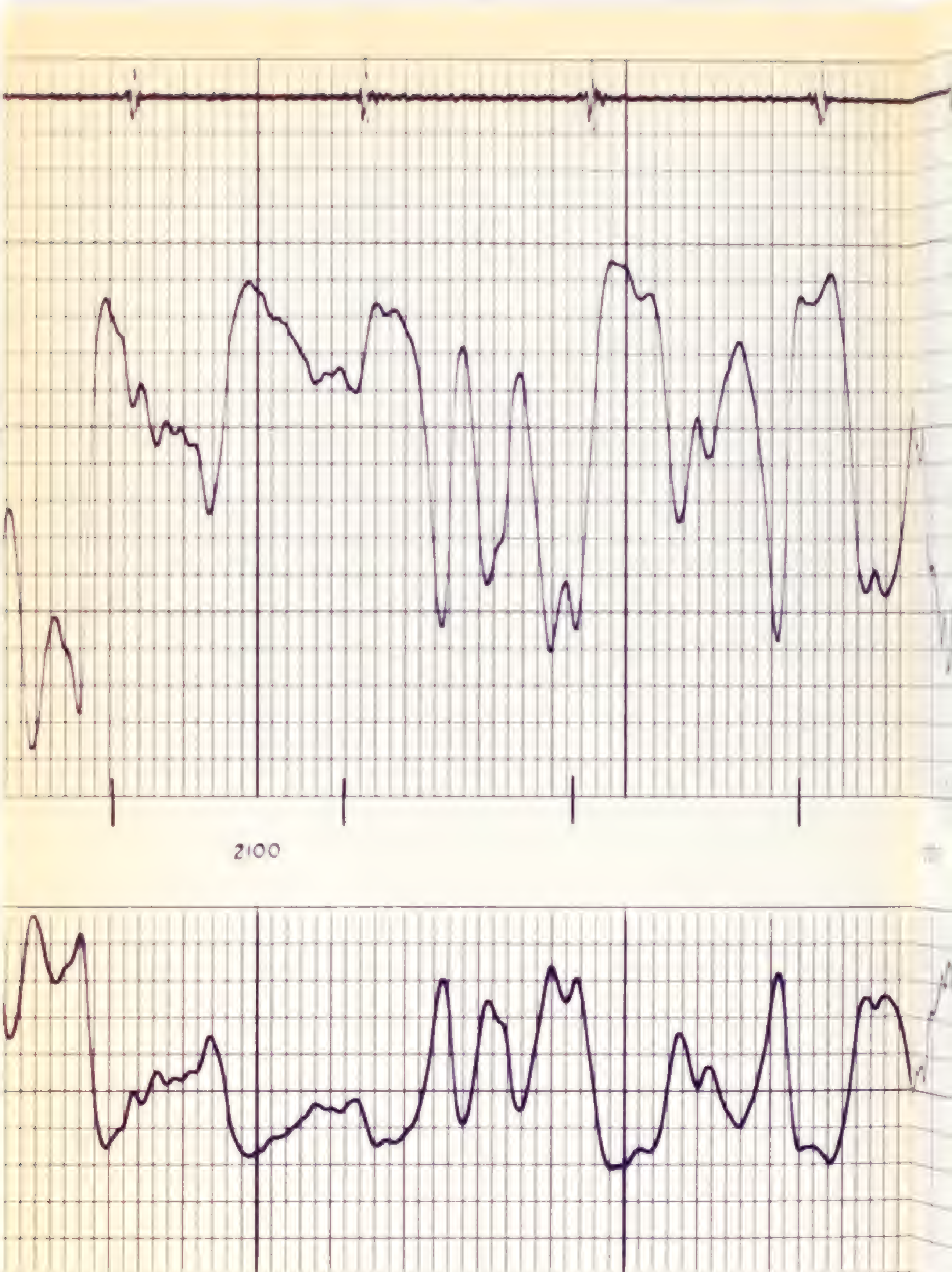


2000

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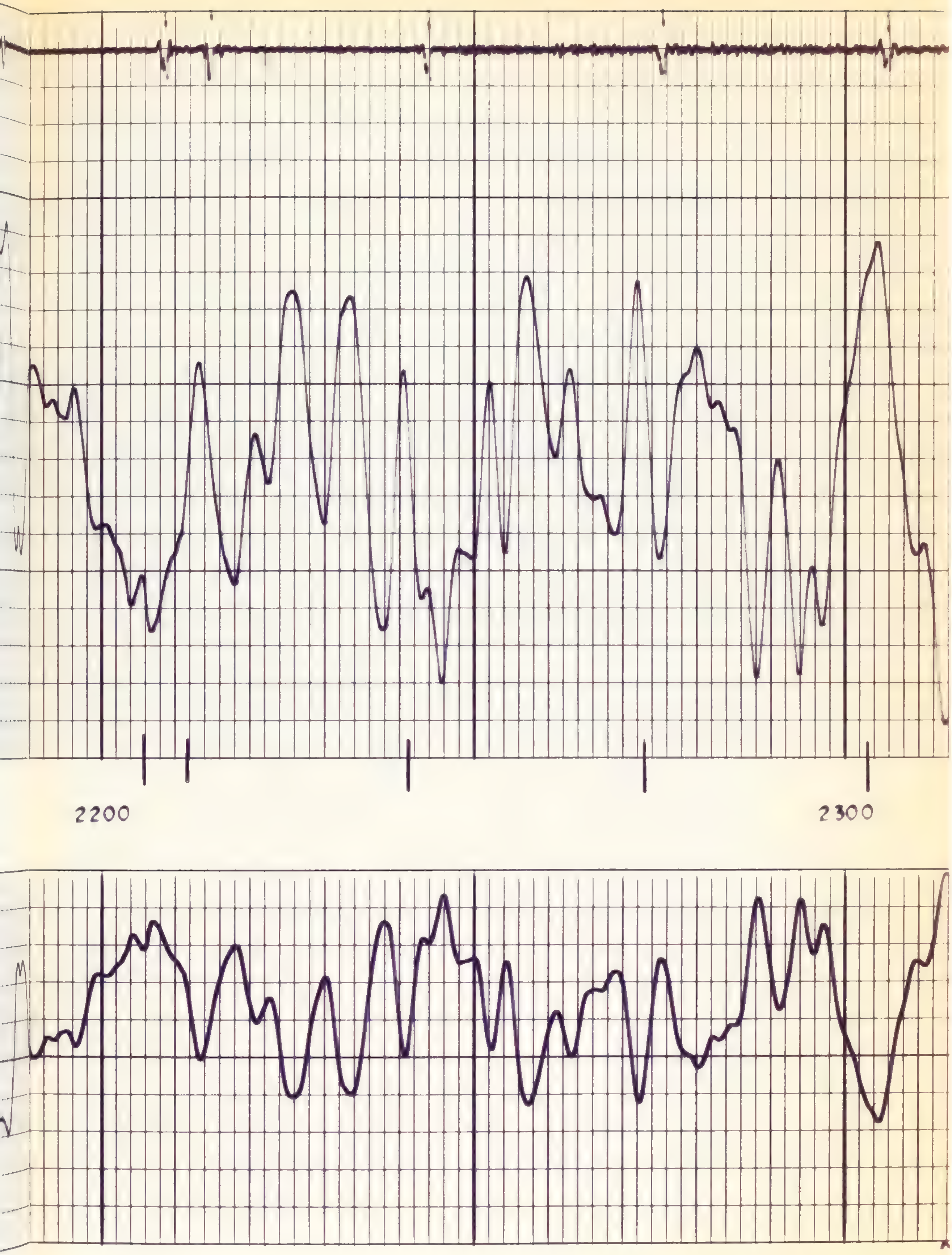
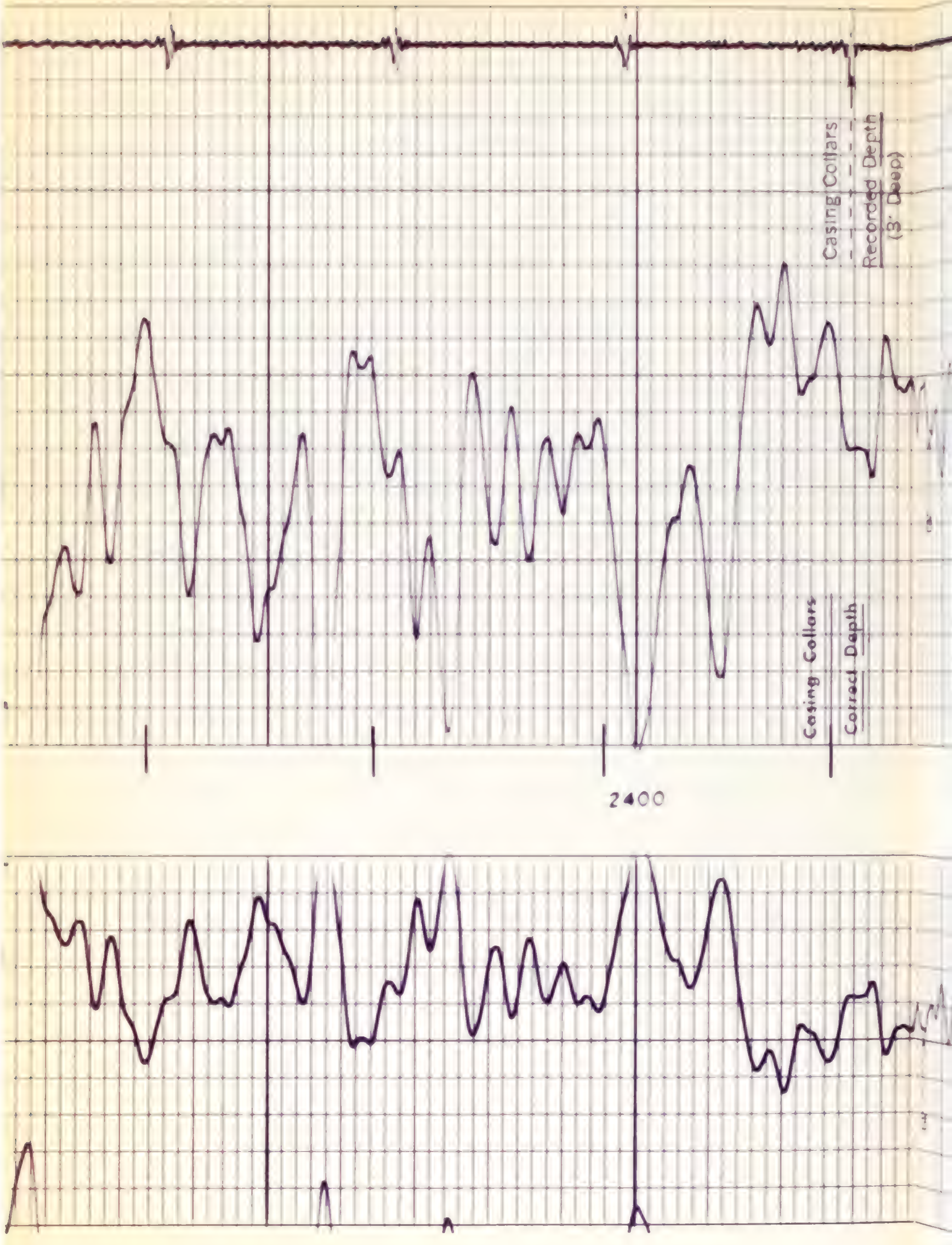
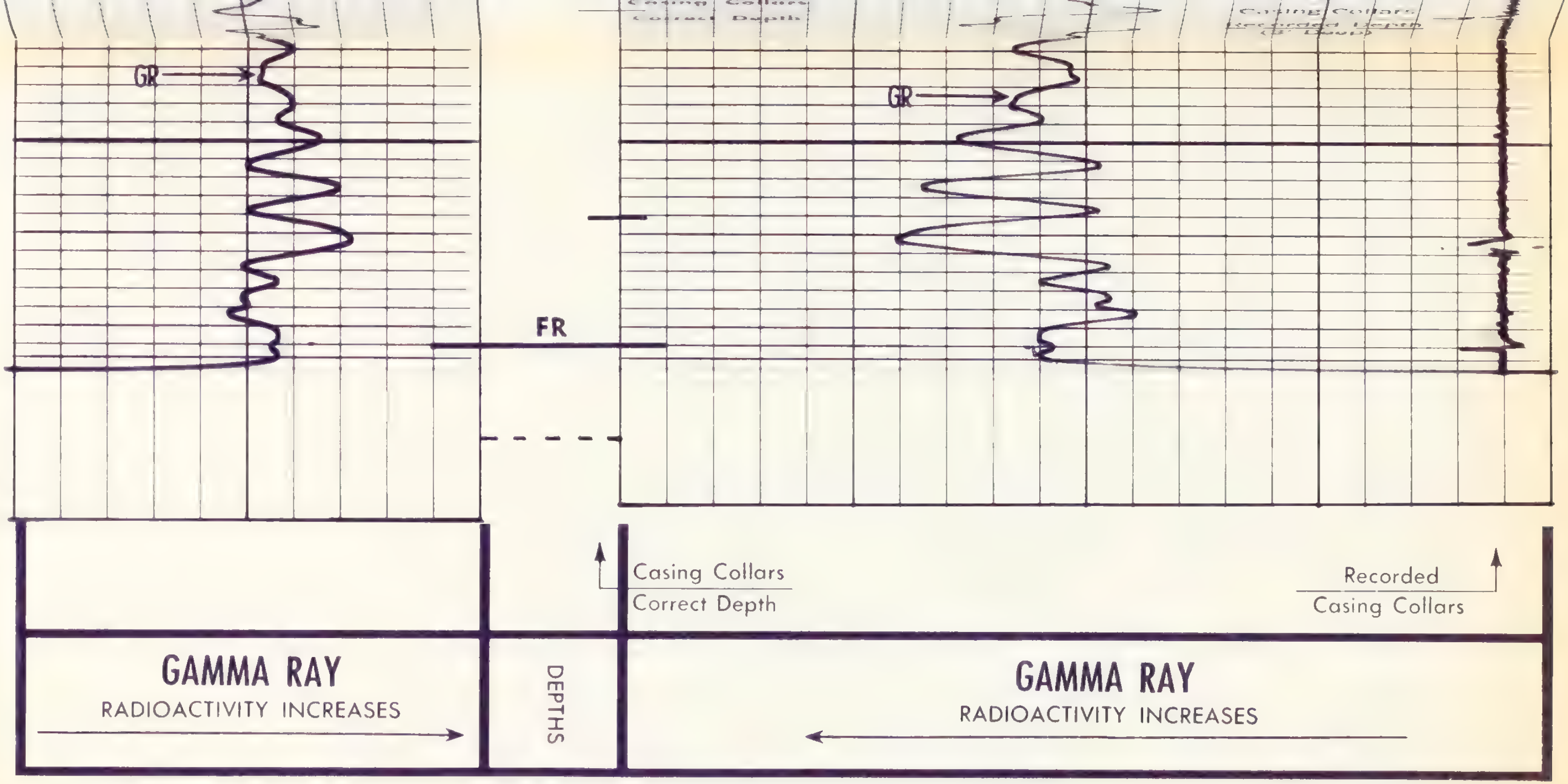
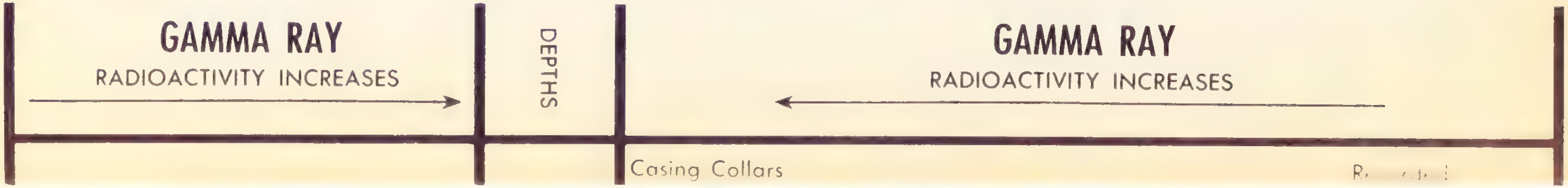
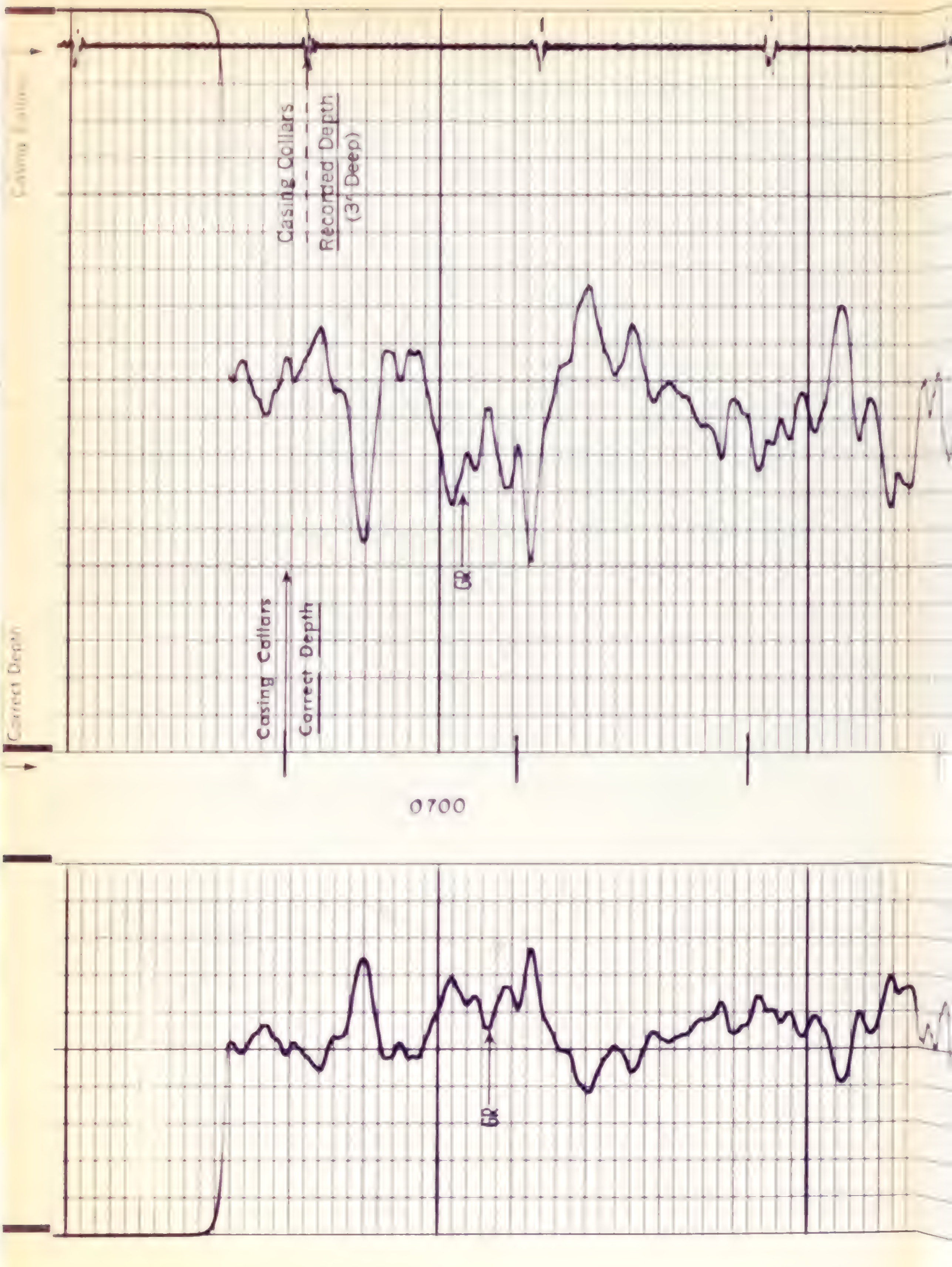
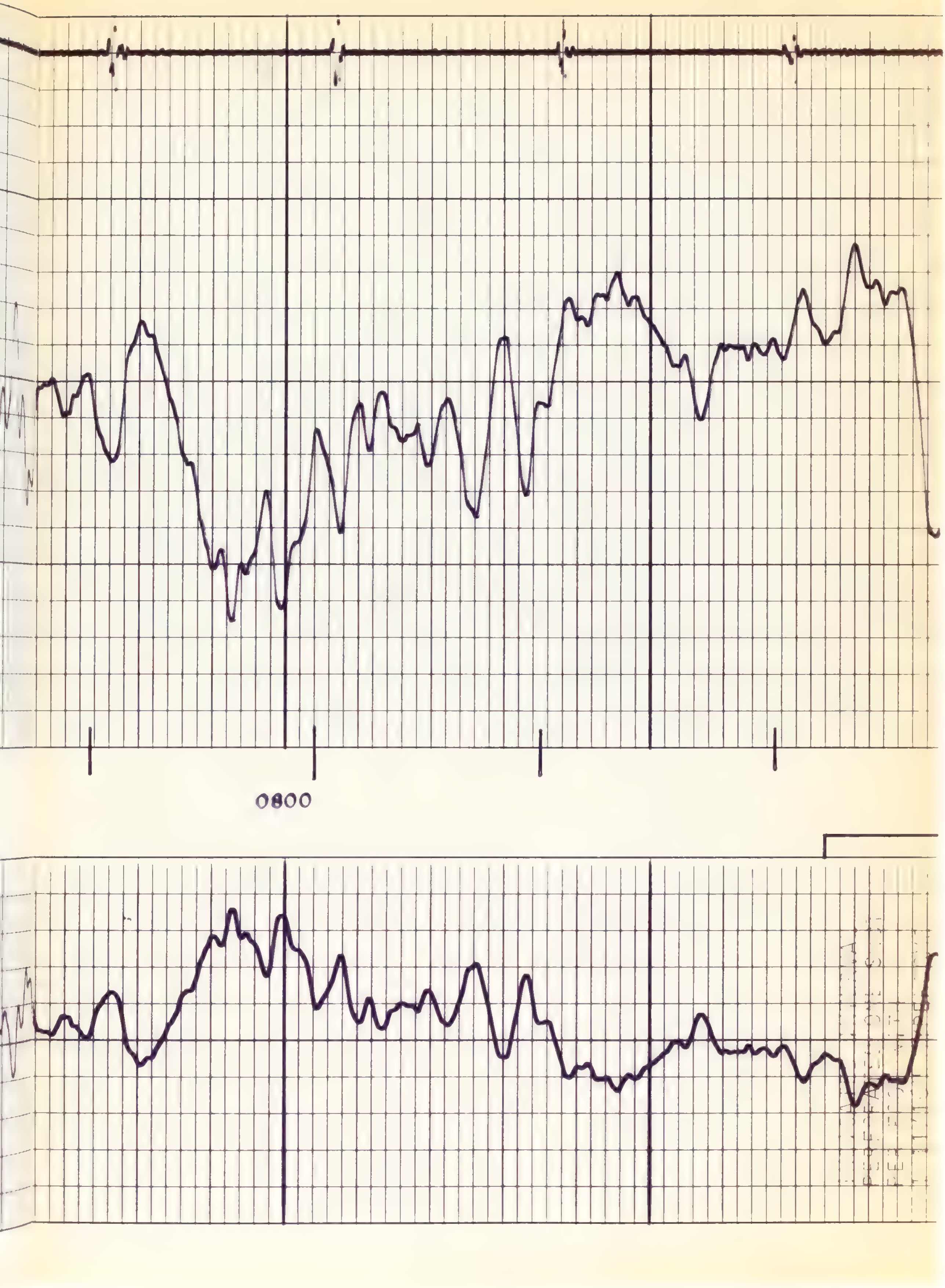

2200
2300


Casing Collars
Recorded Depth
(3' Deep)
Casing Collars
Correct Depth
2400


GR
GR
FR
Casing Collars
Correct Depth
Recorded
Casing Collars
GAMMA RAY
RADIOACTIVITY INCREASES
DEPTHS
GAMMA RAY
RADIOACTIVITY INCREASES


GAMMA RAY
RADIOACTIVITY INCREASES
DEPTHS
GAMMA RAY
RADIOACTIVITY INCREASES
Casing Collars


Casing Collar
Correct Depth
Casing Collars
Recorded Depth
(3' Deep)
Casing Collars
Correct Depth
GR
0700
GR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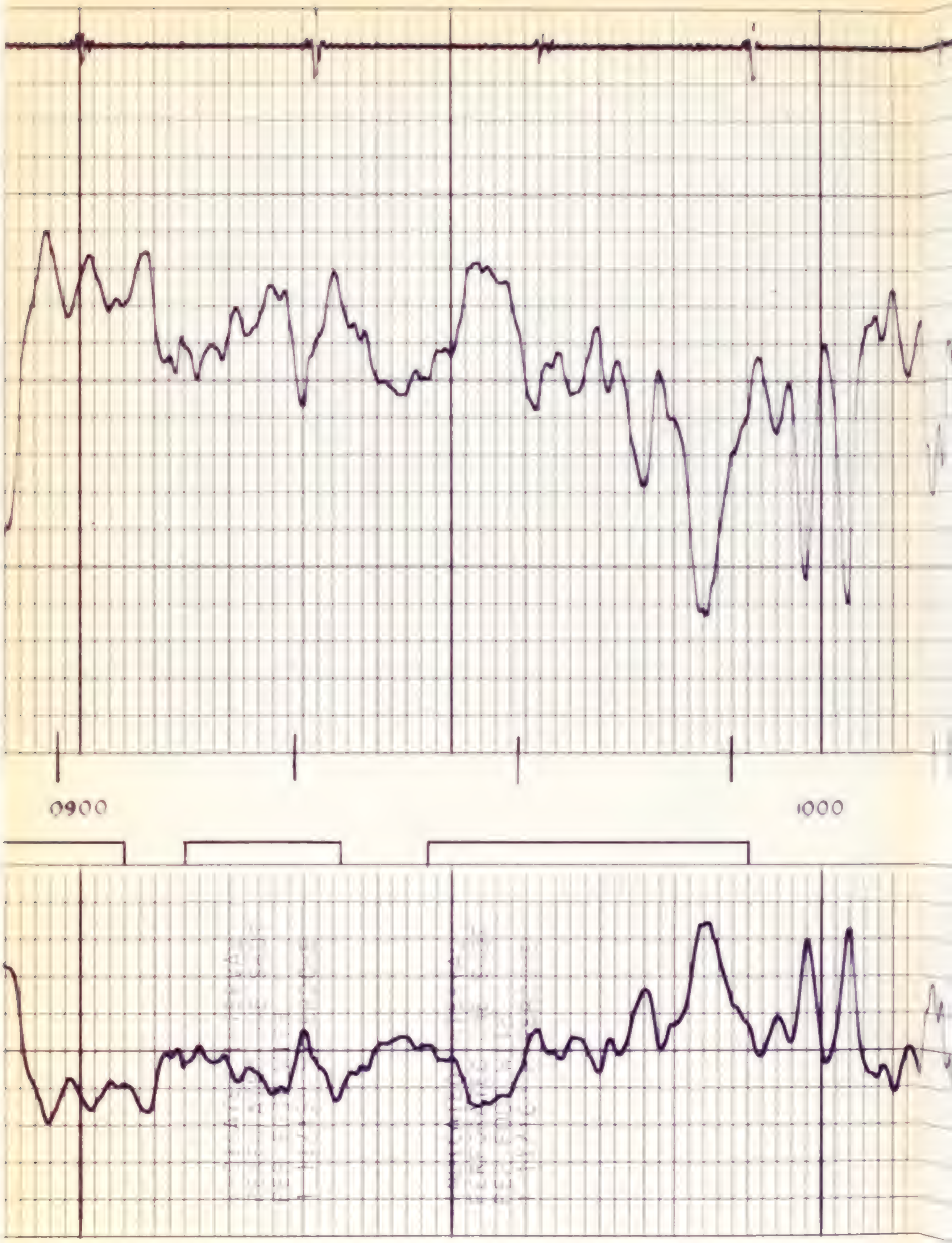
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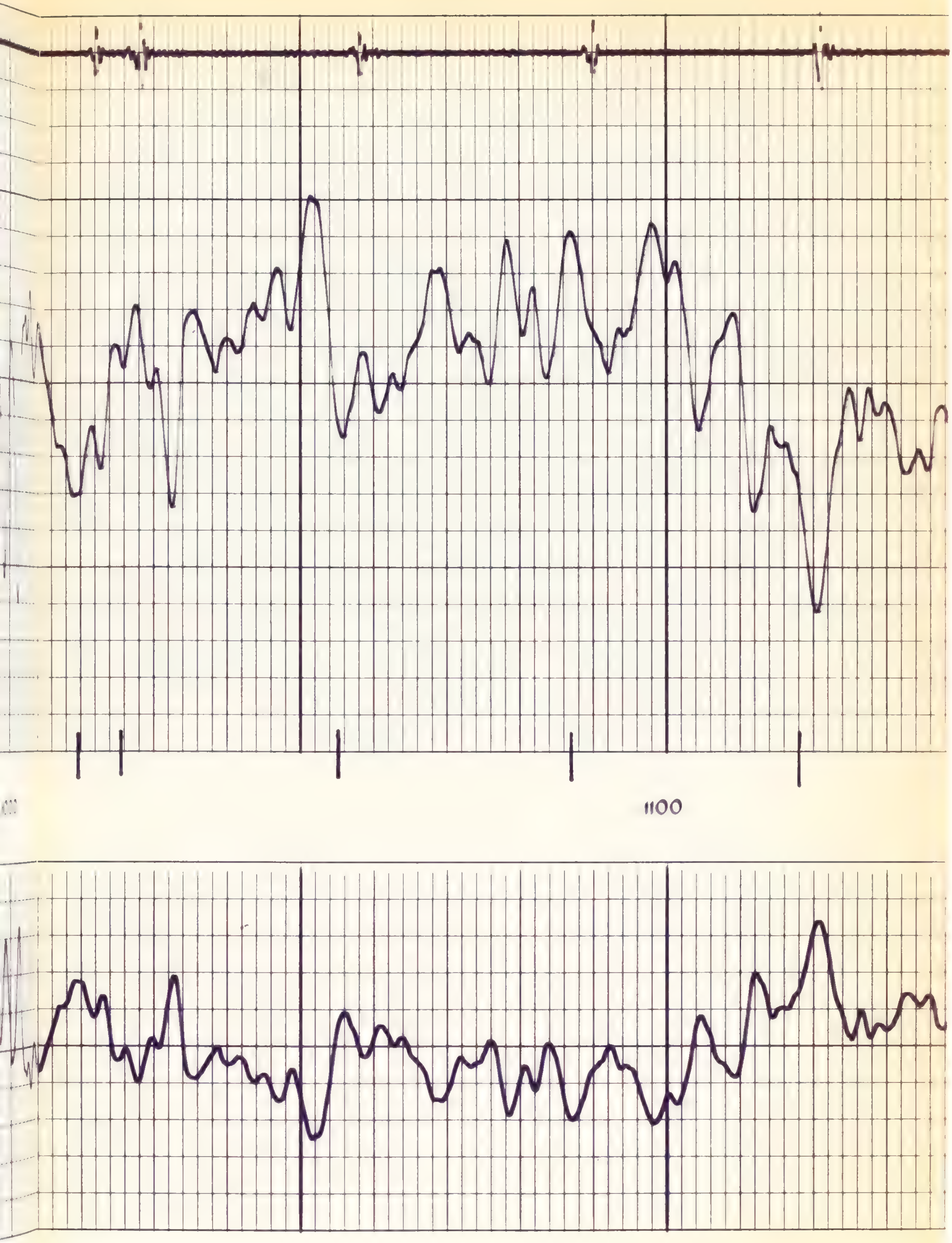
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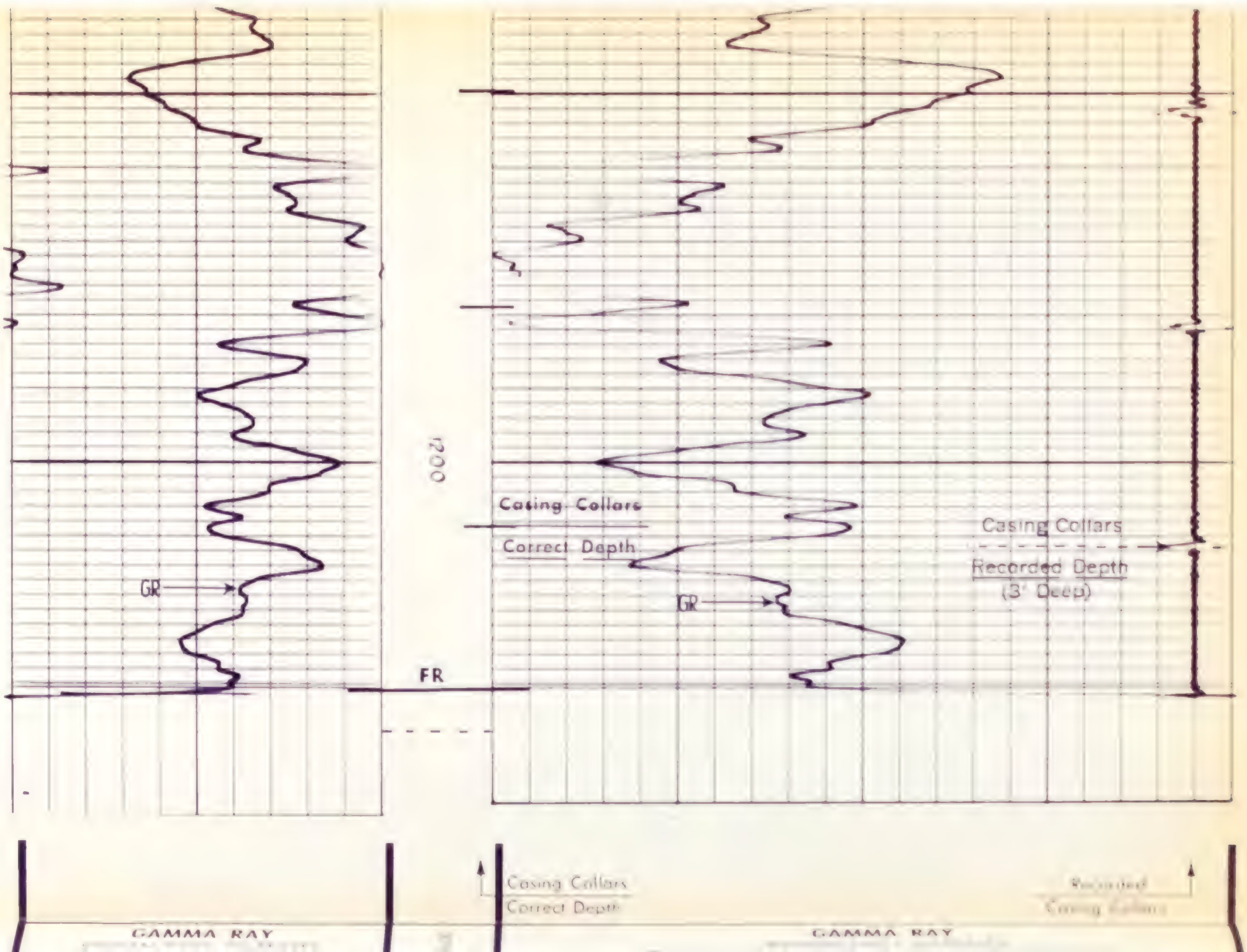

1200
FR
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(3' Deep)
GR
GR
Casing Collars
Correct Depth
Recorded
Casing Collars
GAMMA RAY
GAMMA RAY

Casing Collars
Correct Depth

Recorded
Casing Collars

GAMMA RAY RADIOACTIVITY INCREASES →	DEPTHS	GAMMA RAY ← RADIOACTIVITY INCREASES

COMPANY ATLANTIC RICHFIELD COMPANY

WELL [illegible] 1

FIELD [illegible]

COUNTY [illegible] STATE [illegible]

SCHL. FR 4[illegible]·1
SCHL. TD 48[illegible]·1
DRLR. TD 519·1

COUNTY

FIELD or

LOCATION

WELL

[illegible]

Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL S.G. NO. 1
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.1

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: 1946' FEL &
1314' FSL

Sec. 2 Twp. 3S Rge. 97W

Other Services:
CBL-VDL
PDC-GR

Permanent Datum: GROUND LEVEL ; Elev.: 6428
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6428

Date	
Run No.	ONE
Pipe String No.	ONE/TWO
Pipe String Ident.	LONG/SHORT
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	----
Density	----
Level	FULL
Max rec. temp., deg F.	----
Operating rig time	76 HOURS
Recorded by	ST.AUBYN
Witnessed by	MR. DON TAIT

BORE-HOLE RECORD		
Bit	From	To
6 3/4	154	2540

CEMENTING RECORD				
	Type	Wgt.	From	To
Primary	"G"		1400	2519
Squeeze	THEKO		896	1400

SWS 1521-A

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

EQUIPMENT DATA

Hoist Truck No.	3862	Rotator Size	1 11/16"
Inst. Truck No.	3862	Rotator No.	46
Tool Serial No.	511	Indexer Type	POWERED
Location	VERNAL	Indexer No.	511

DEPTHS RELATE TO

Radioactivity Measurements ☐
Schlumberger Line Measurements ☐

CASING COLLARS

PERFORATING DATA / LOGGING DATA

Depths From	Depths To	No. Shots	Gun Size	Gun Type	Time Const	Sens. Setting	Zero Shift	Calib Sens	Calib Defl
NO. 1 - LONG STRING									
PERFORATIONS MARKED ON COLLAR LOG									
NO. 2 - SHORT STRING									
PERFORATIONS MARKED ON COLLAR LOG									

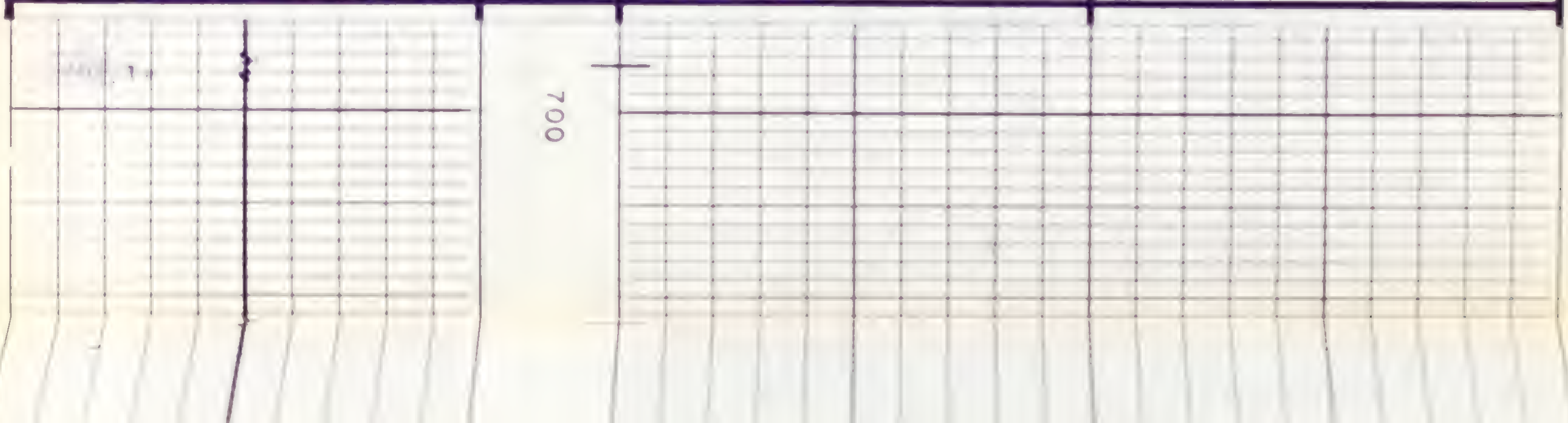
PIPE STRING RECORD

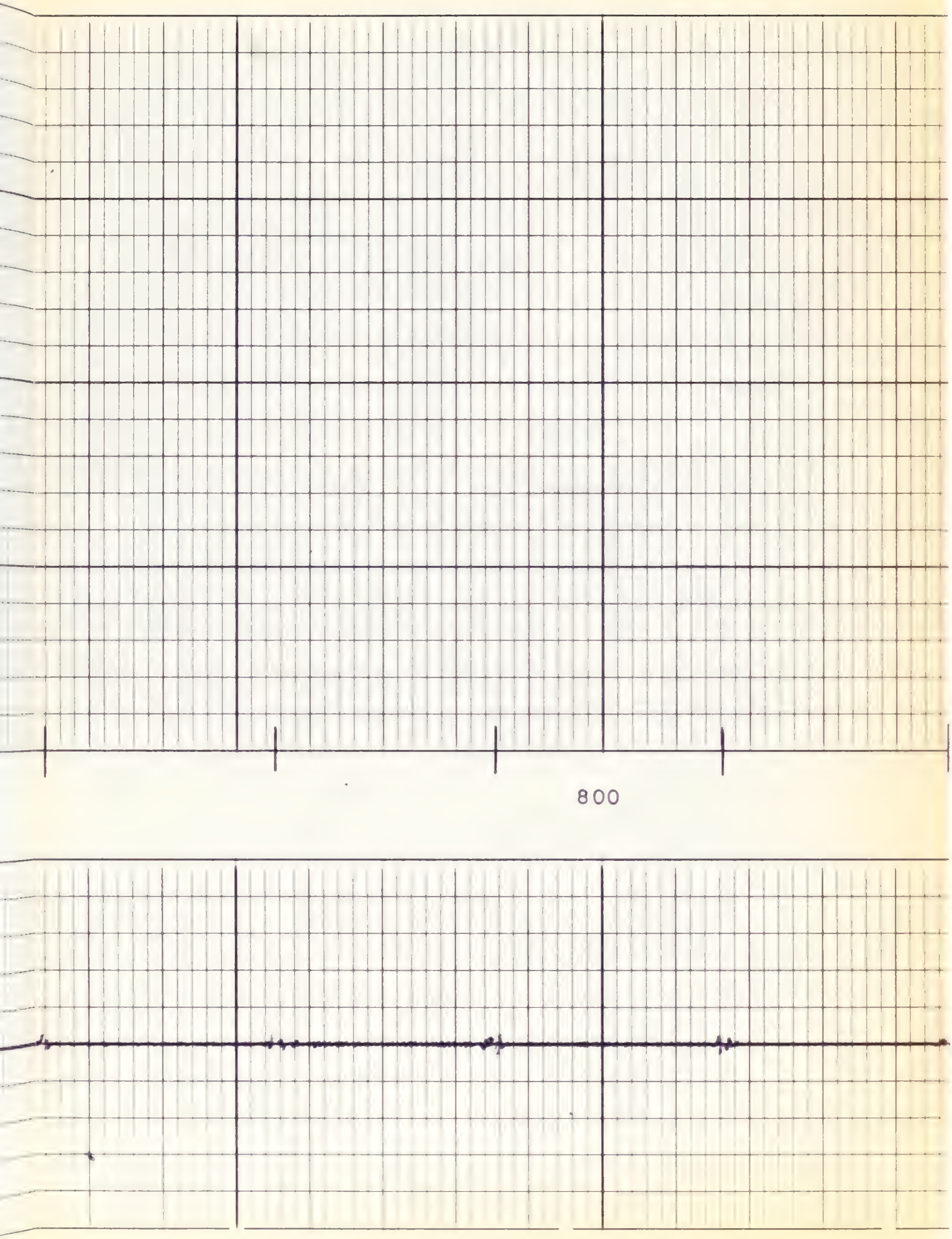
Number	1	2	3	4
Identific'n	LONG	SHORT		
Size	2 3/8"	[illegible]		
Weight	4.7	4.7		
Depth	1519	[illegible]		

Remarks:

CASING COLLAR LOG
BEFORE PERFORATION

DEPTHS

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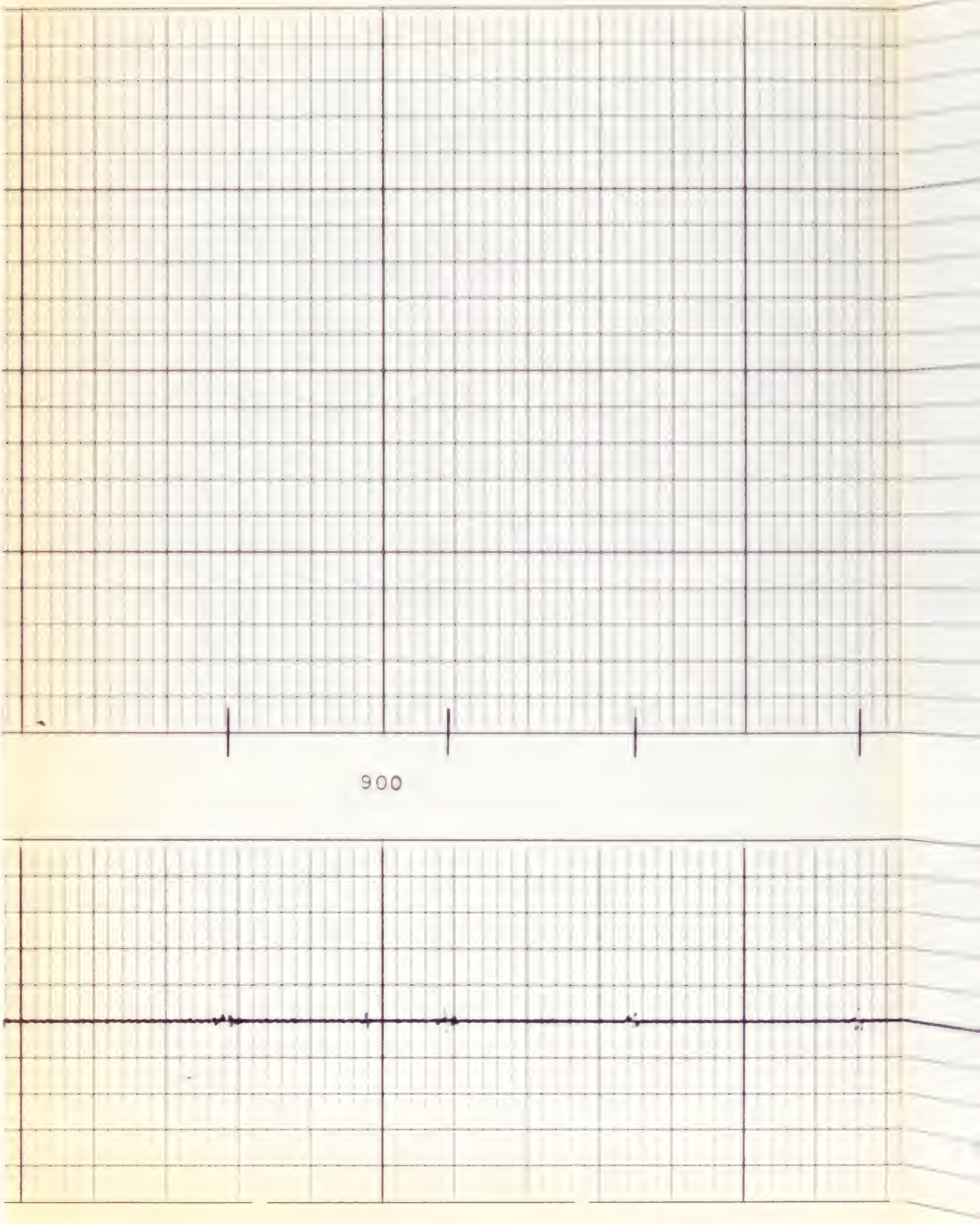
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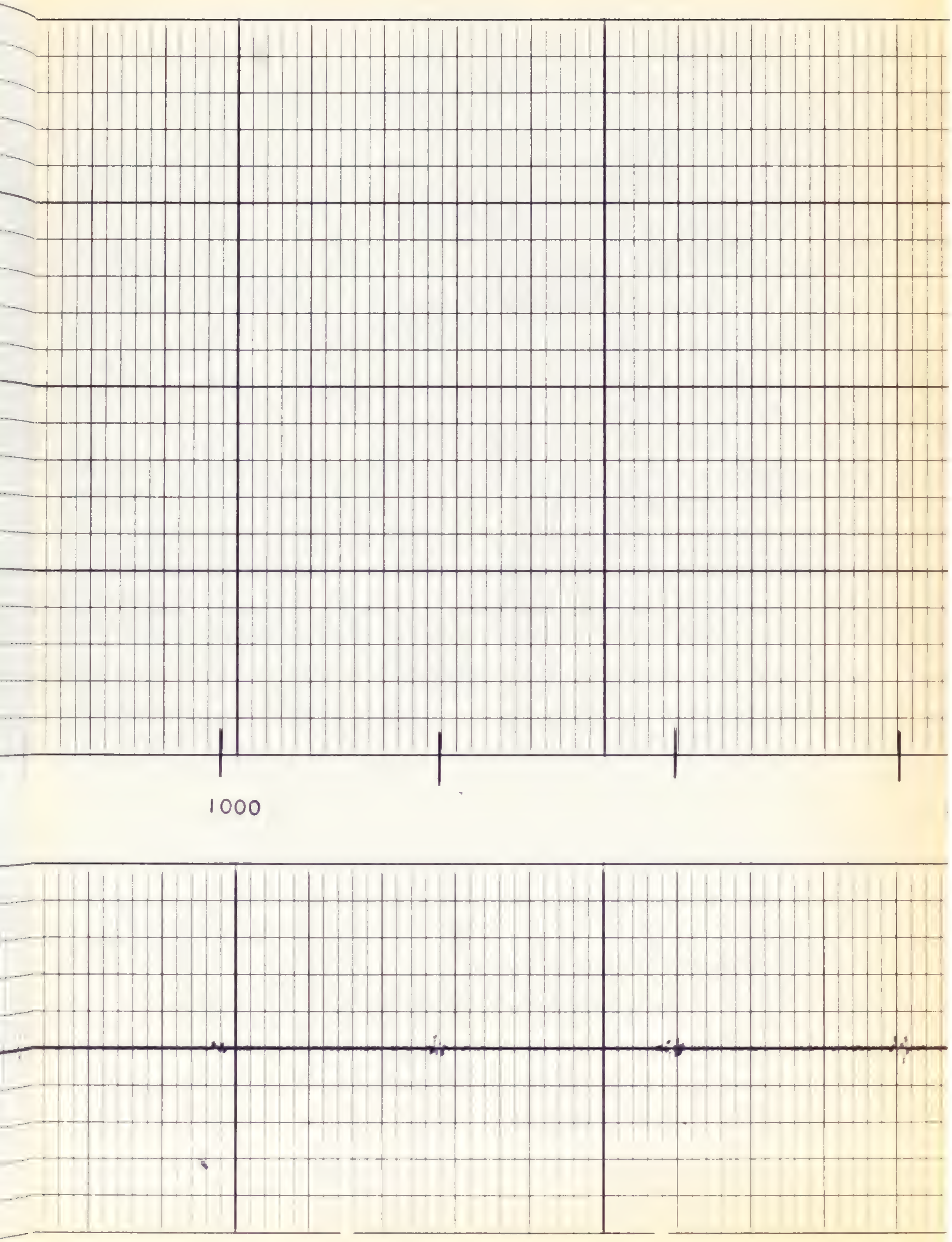
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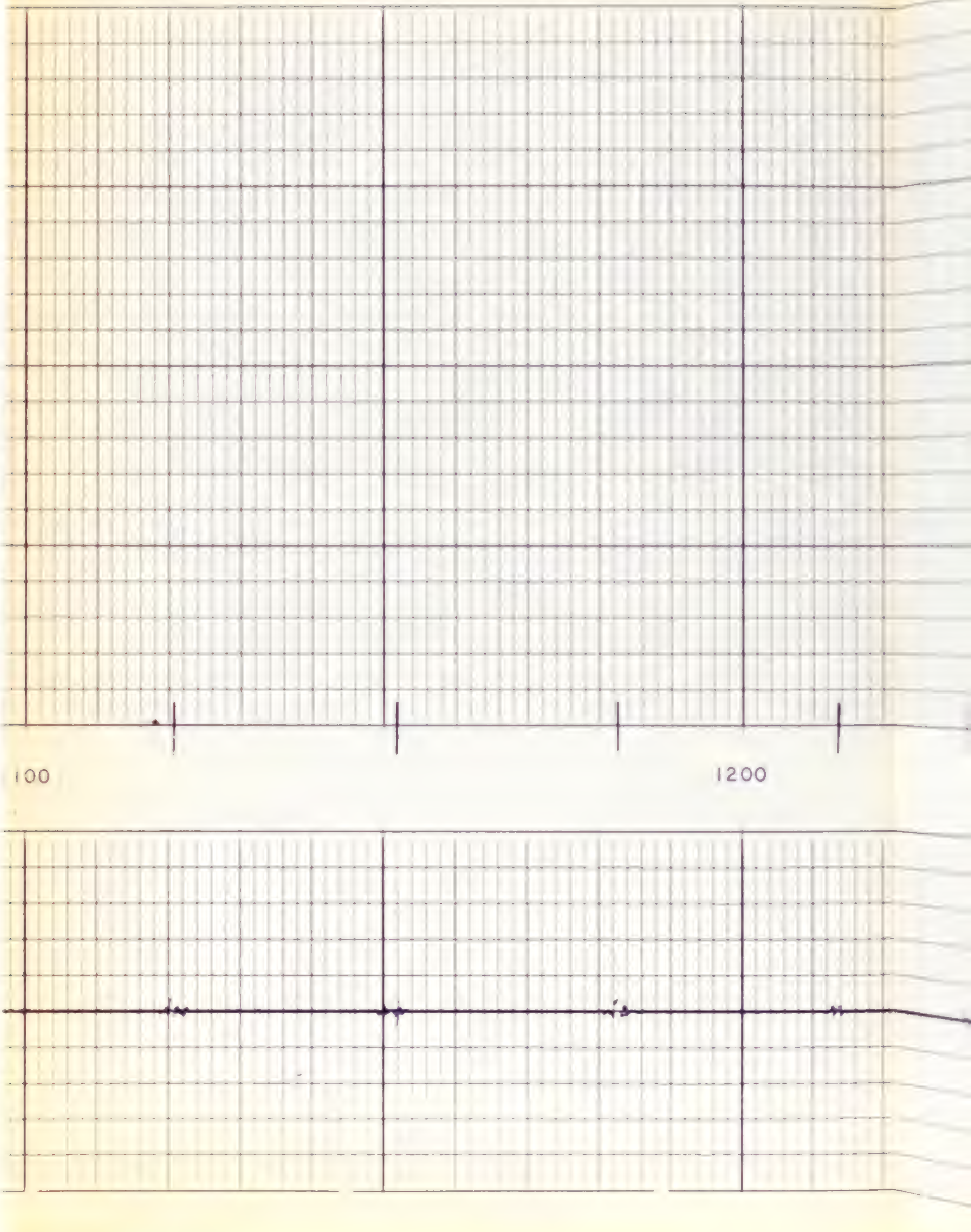
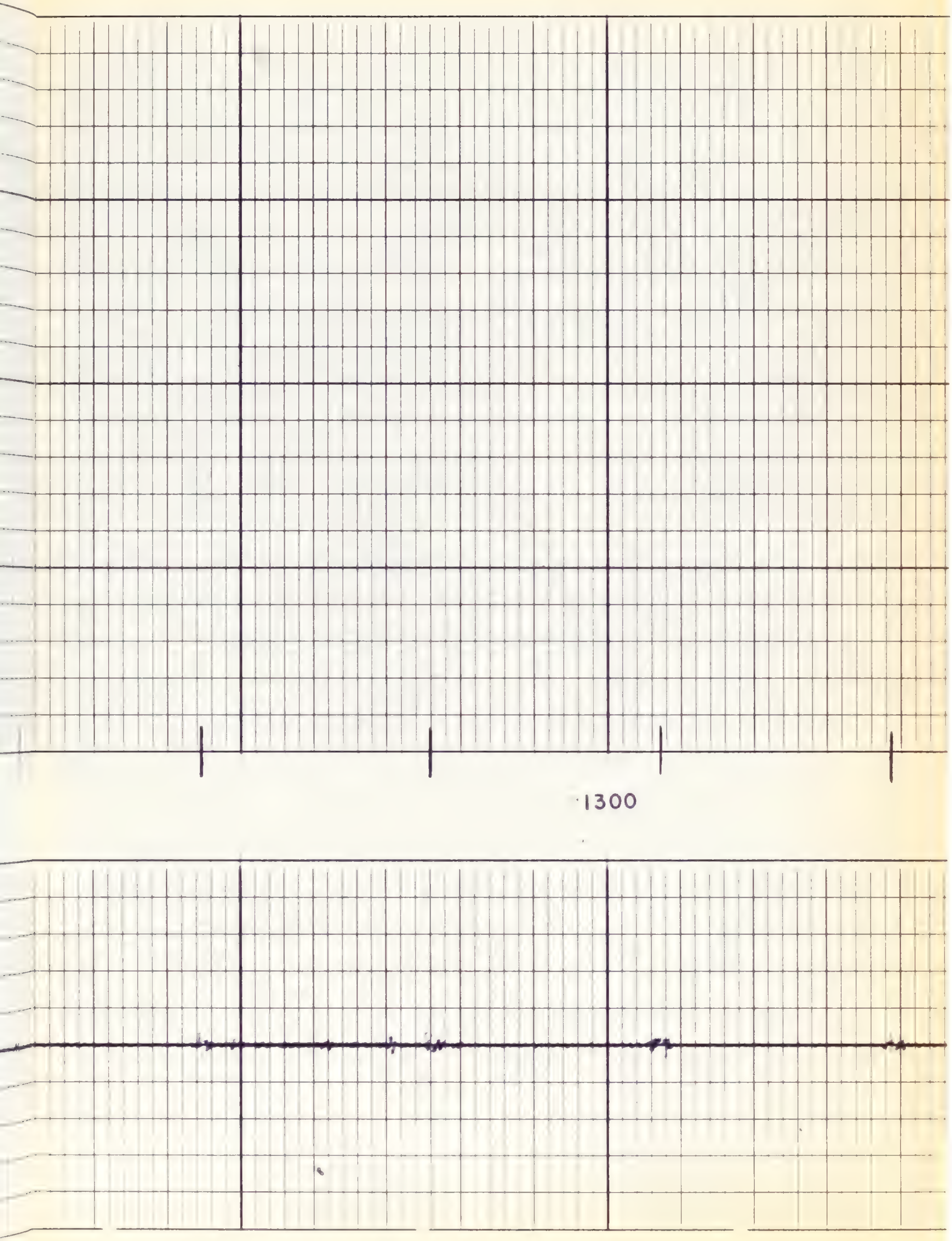
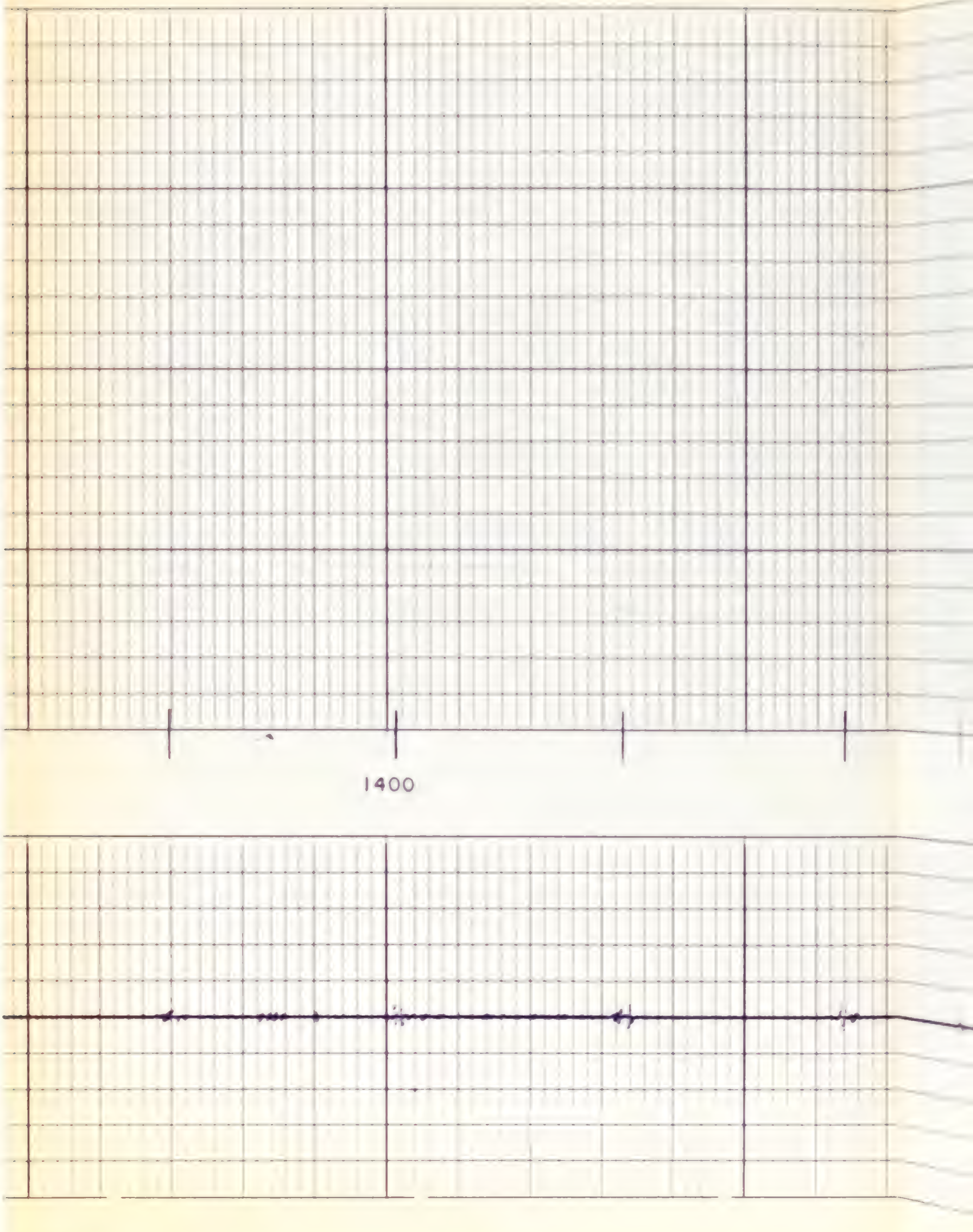
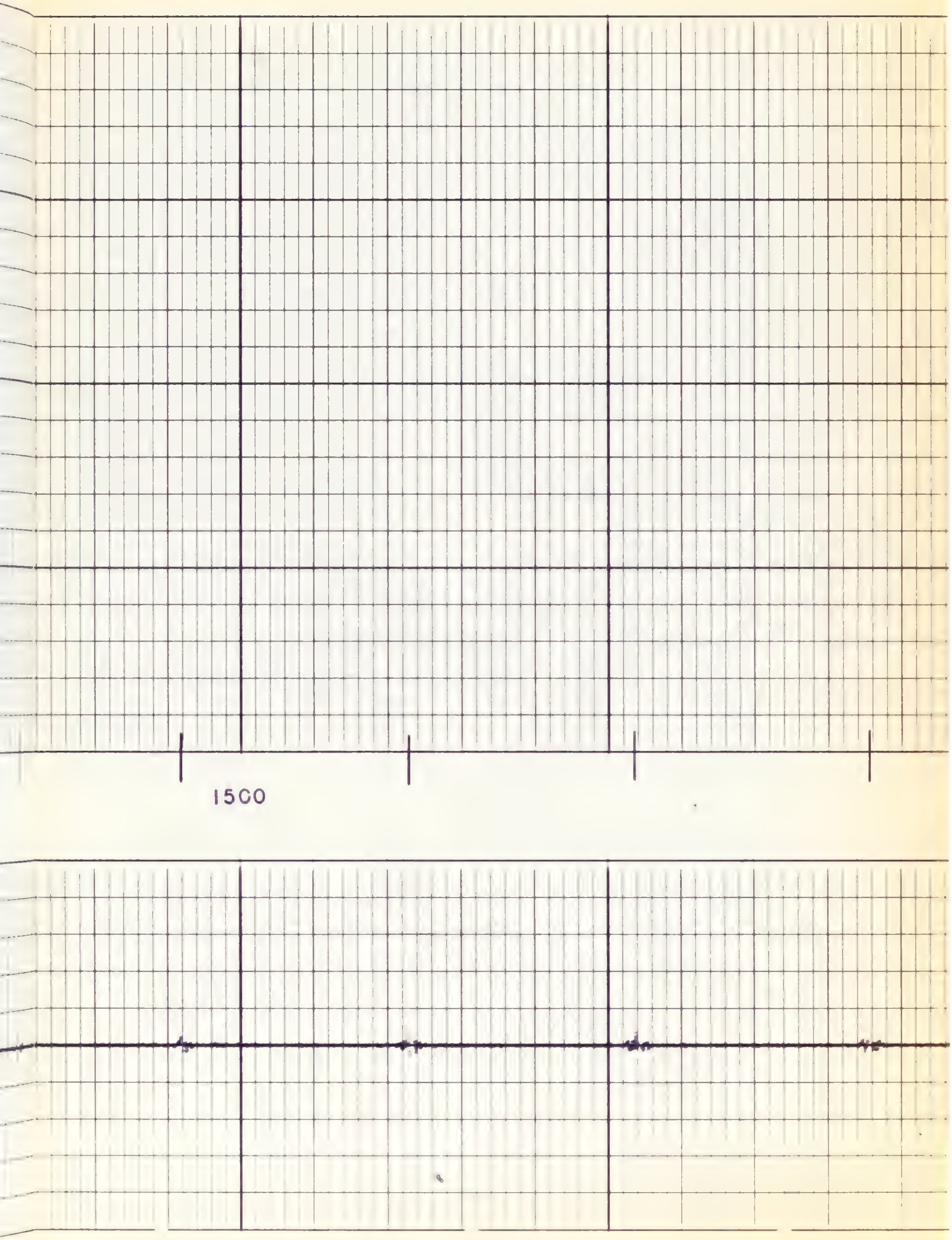
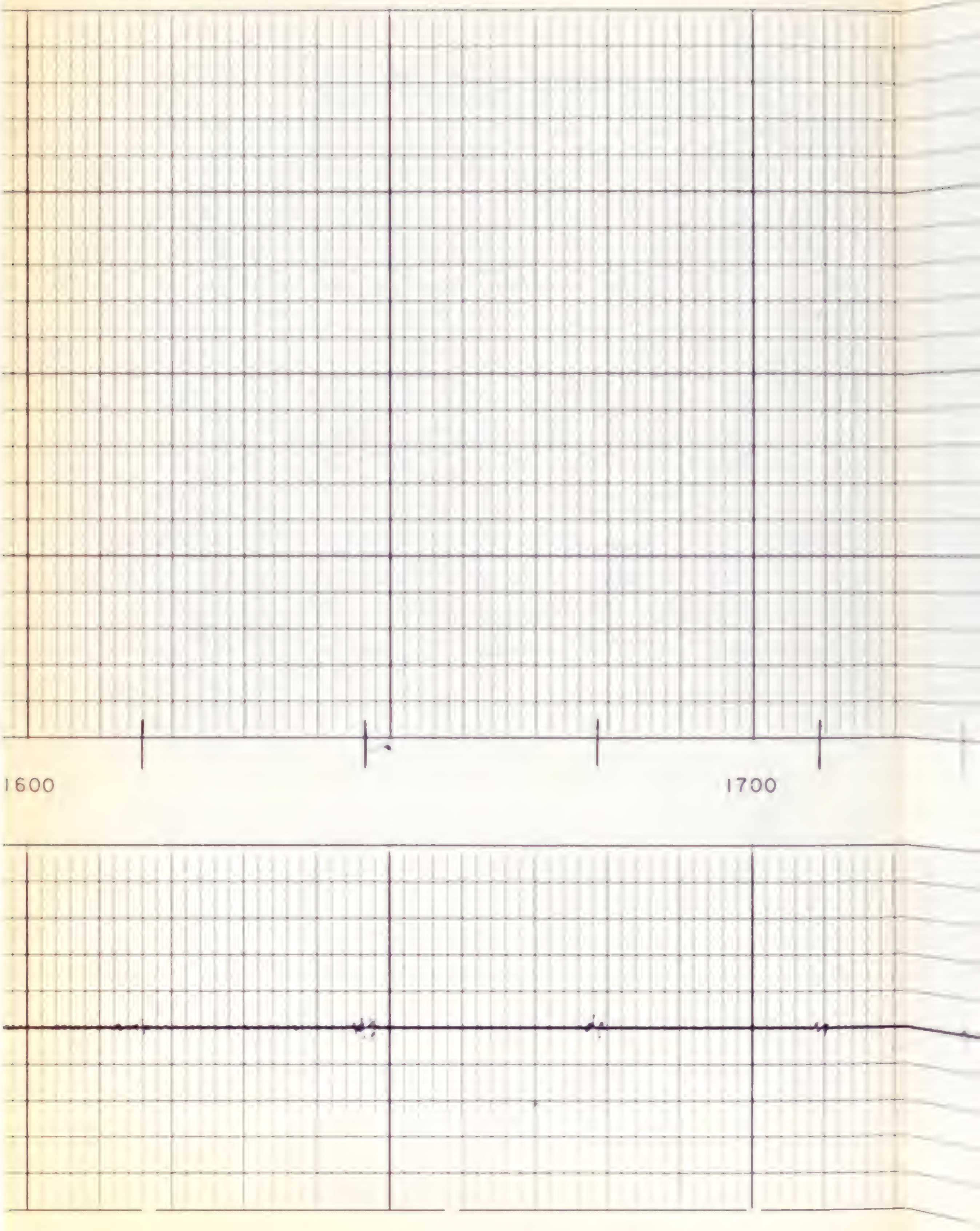

100
1200


1300


1400


1500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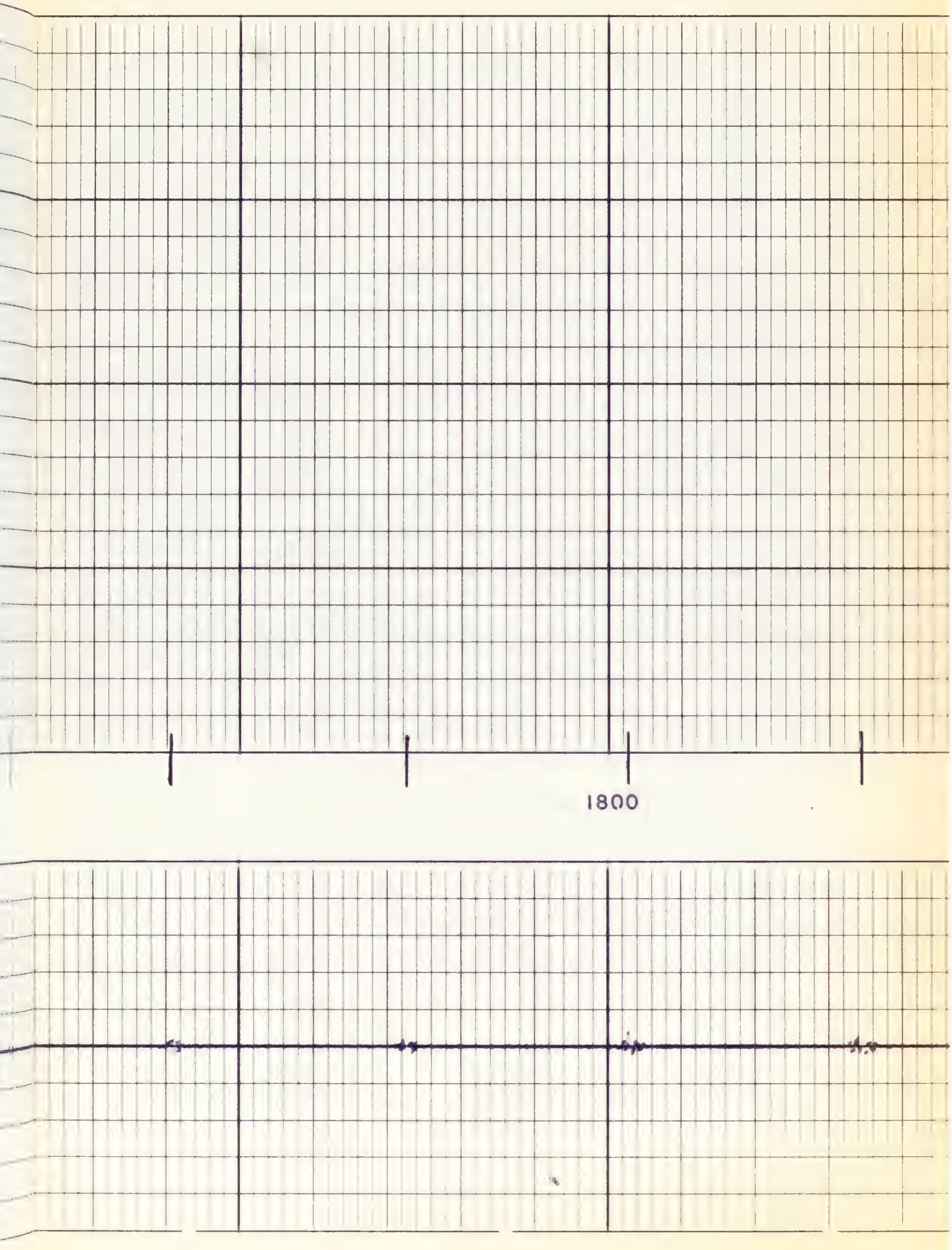
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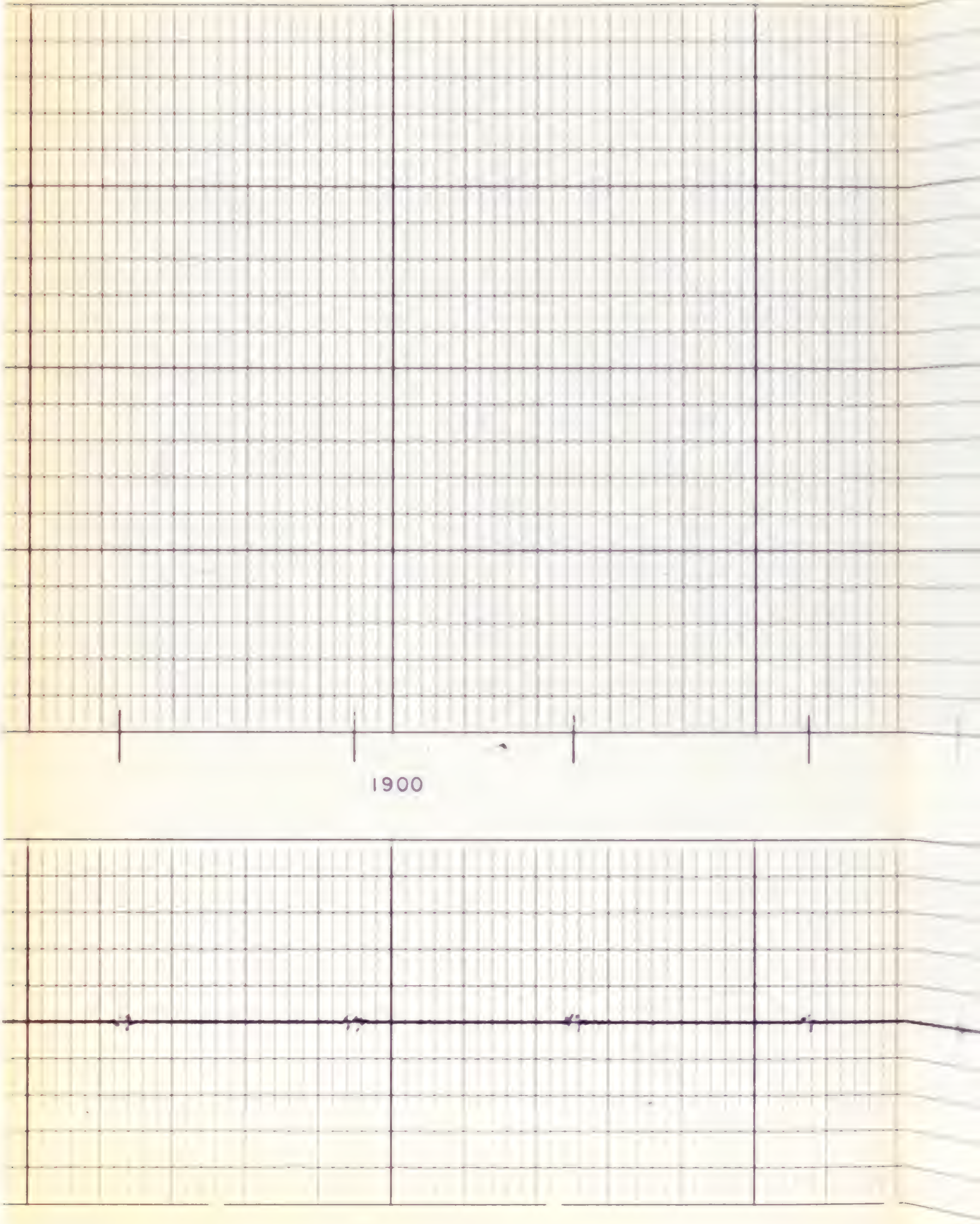
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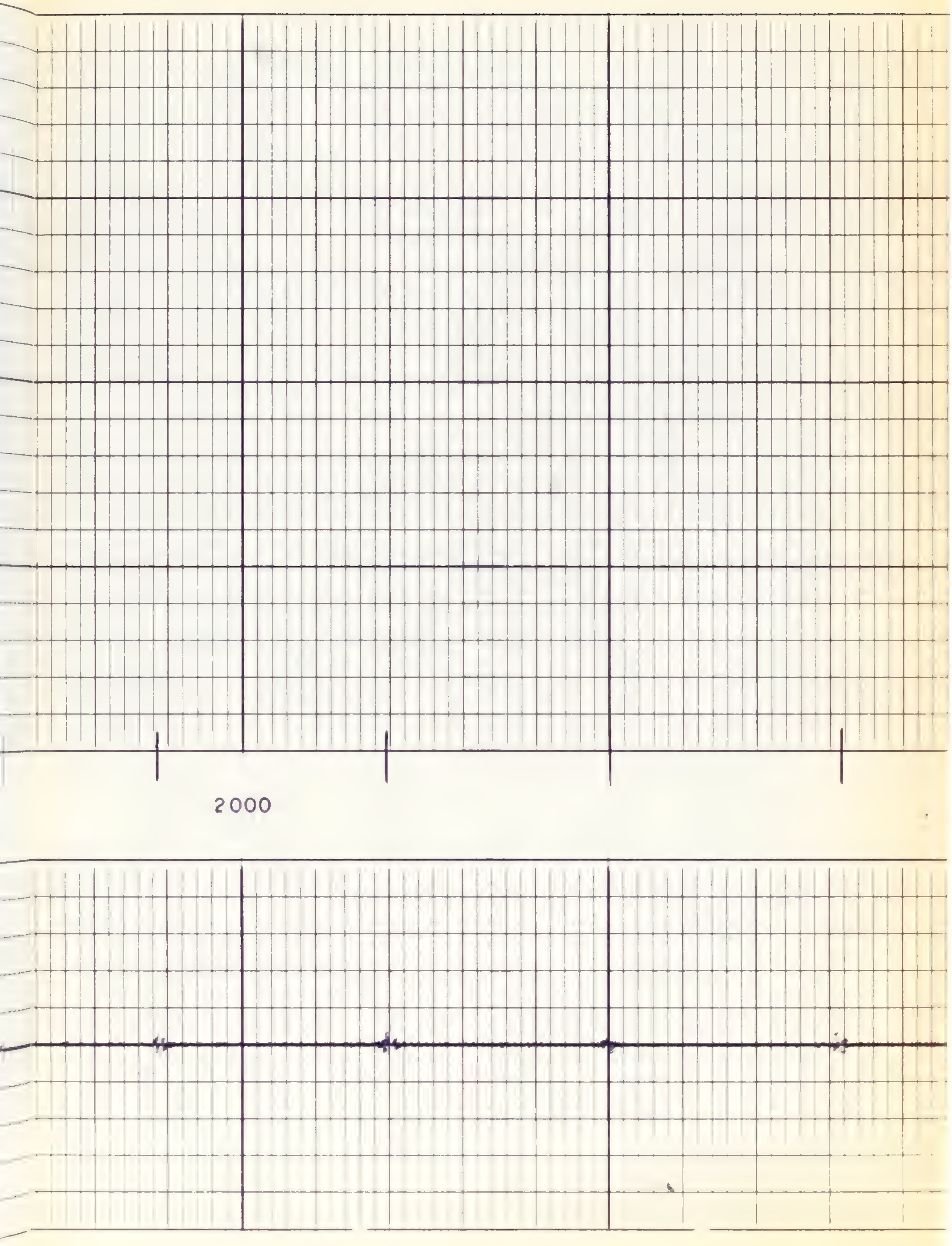
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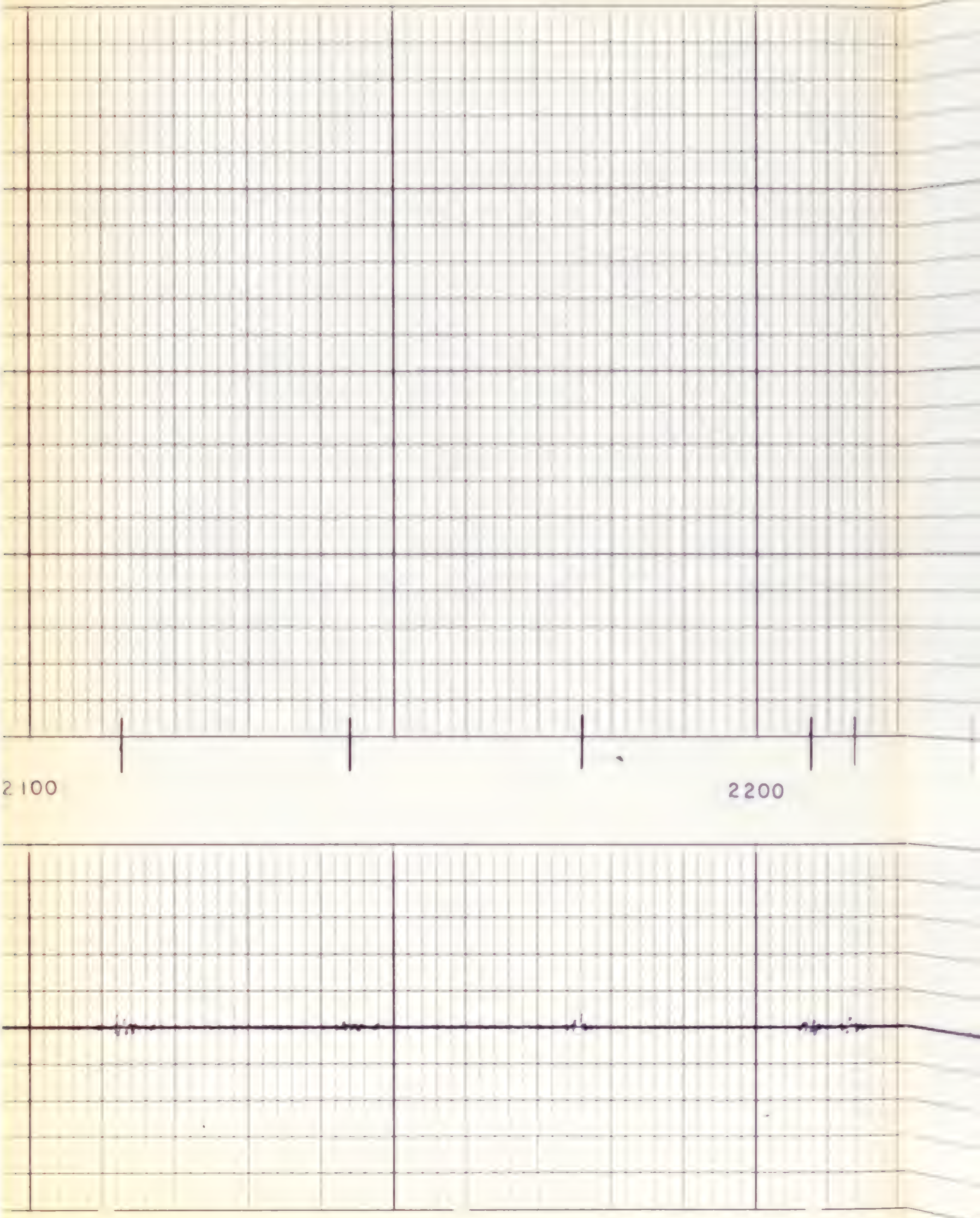
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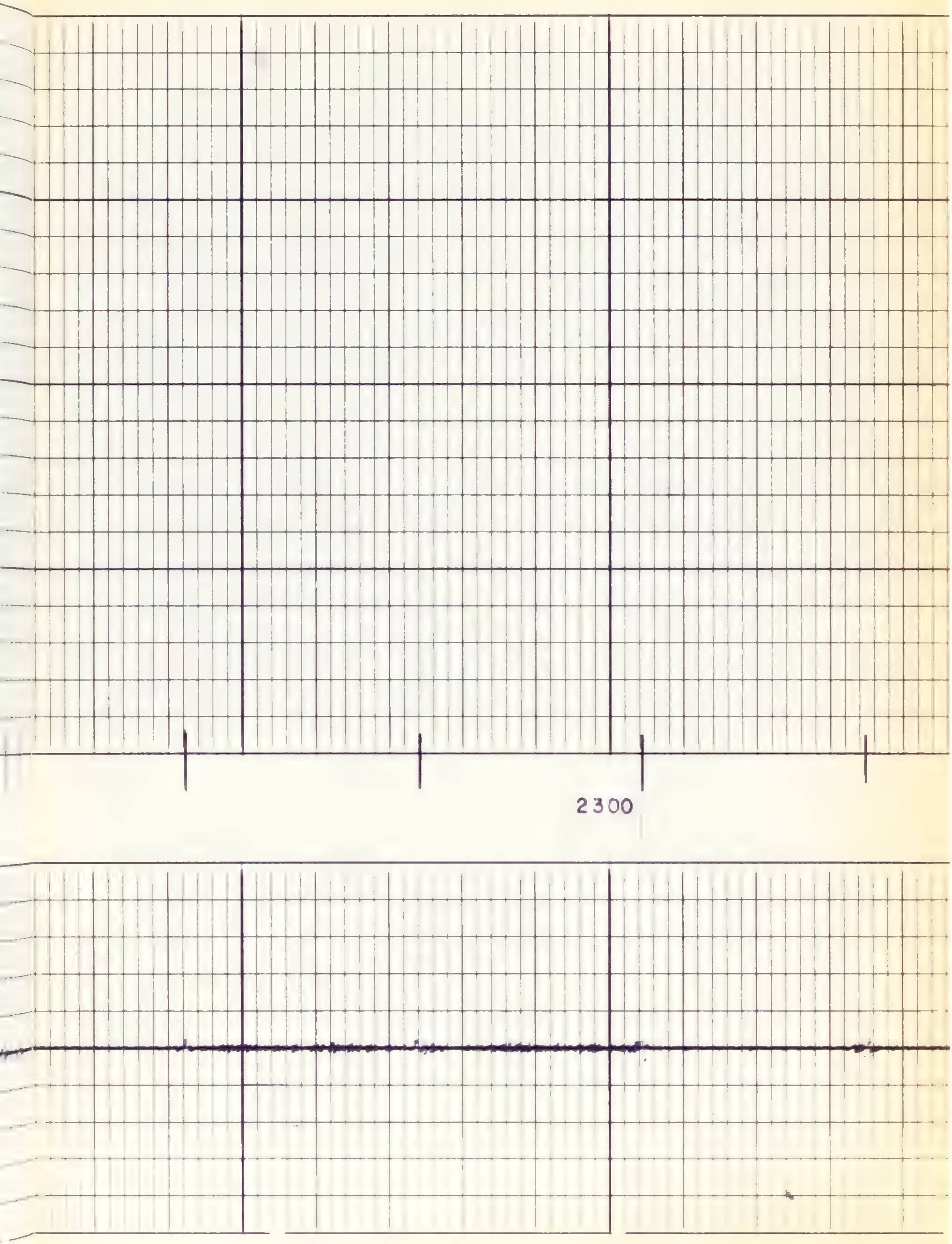
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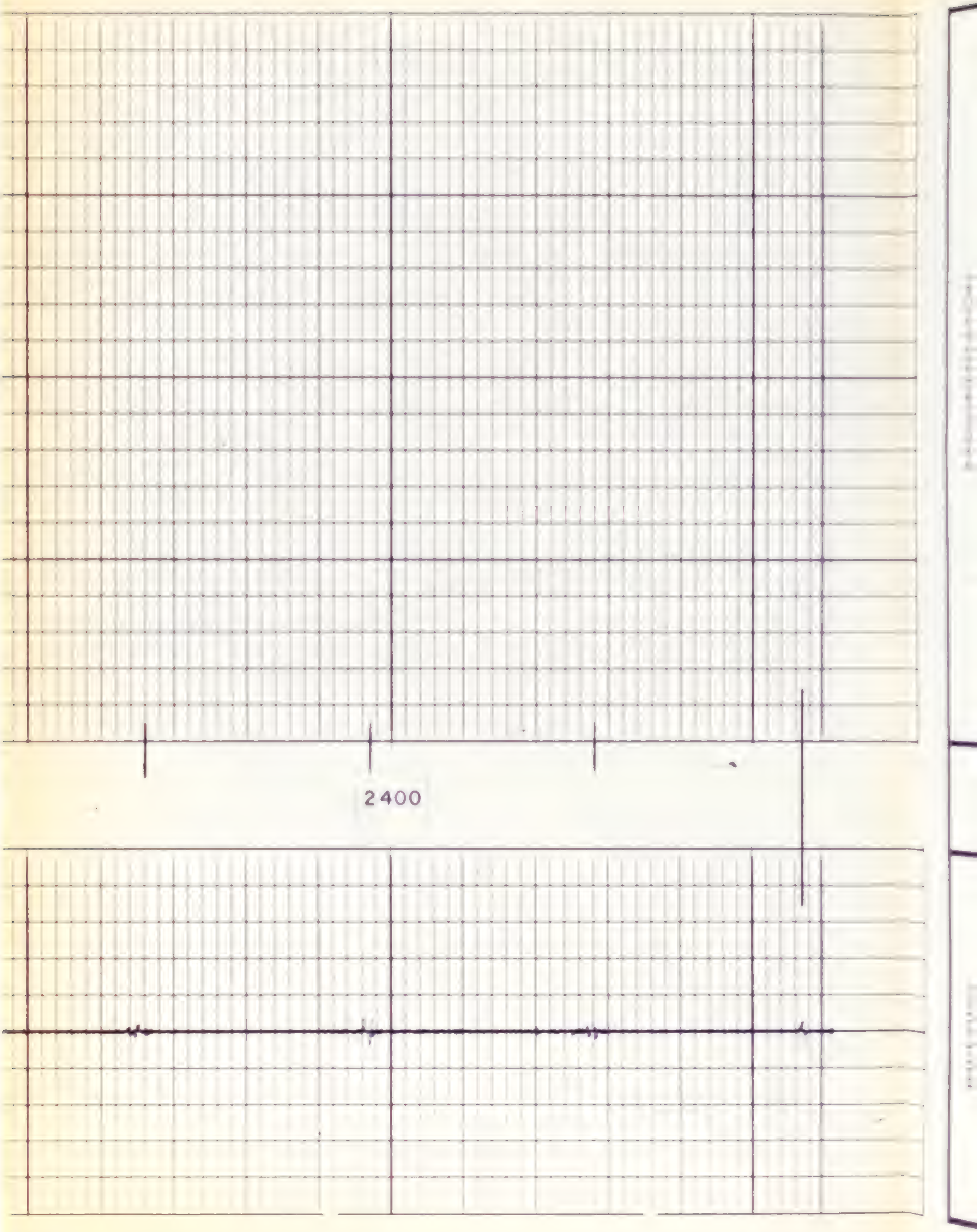
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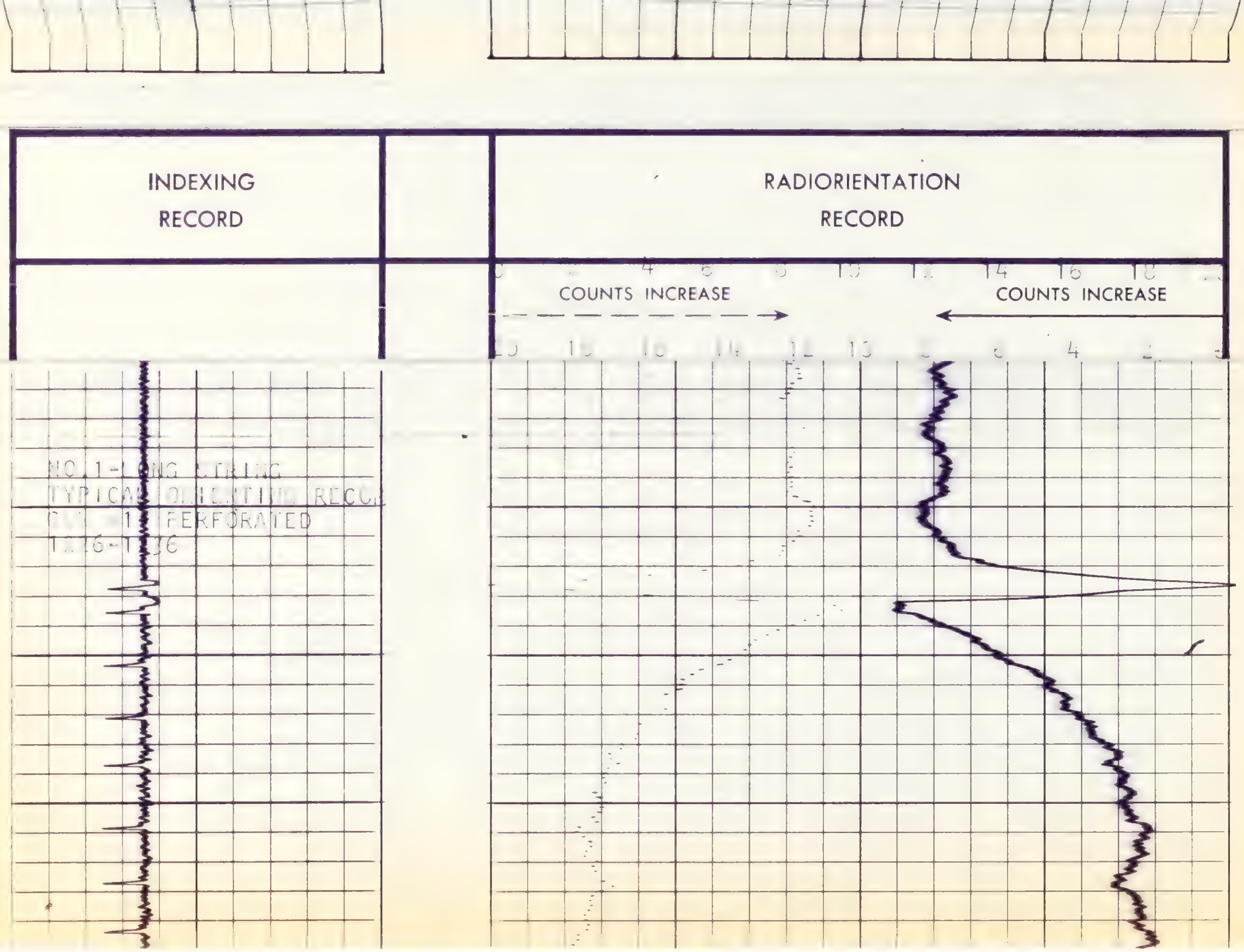
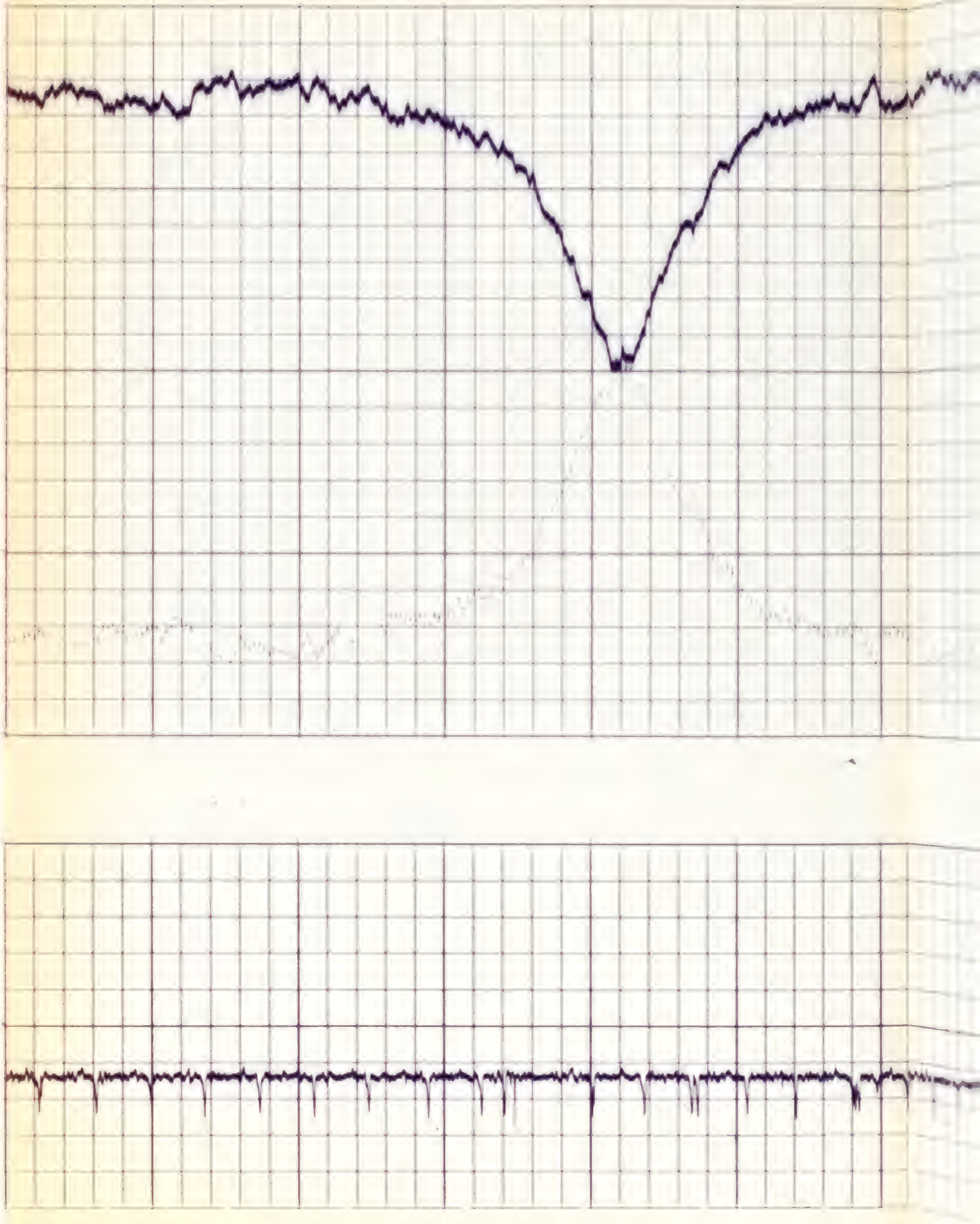
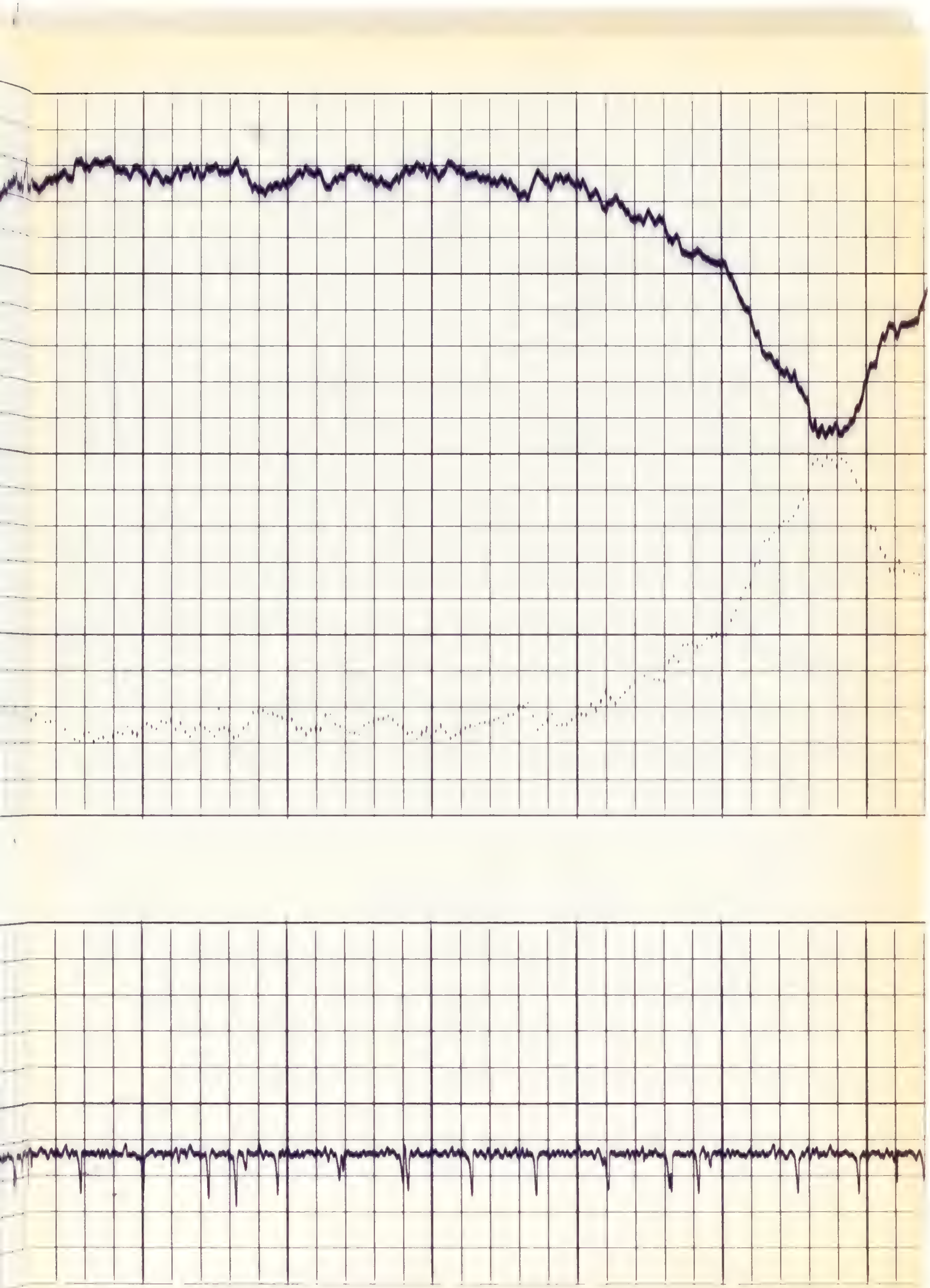
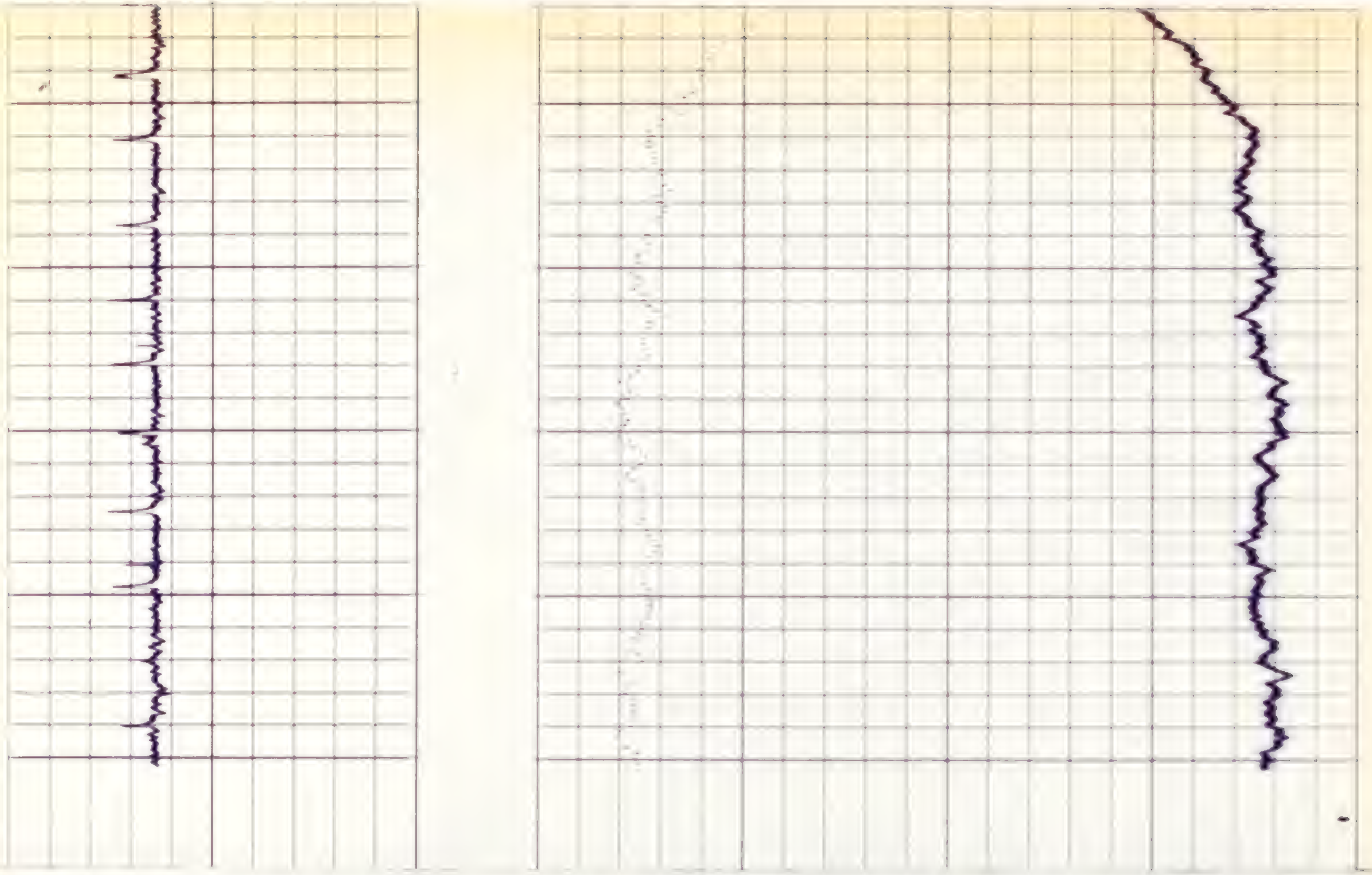

INDEXING RECORD
RADIORIENTATION RECORD
0 2 4 6 8 10 12 14 16 18 20
COUNTS INCREASE
COUNTS INCREASE
20 18 16 14 12 10 8 6 4 2 0
NO. 1-LONG STRING
TYPICAL ORIENTING RECO
1 PERFORATED
6-1 36





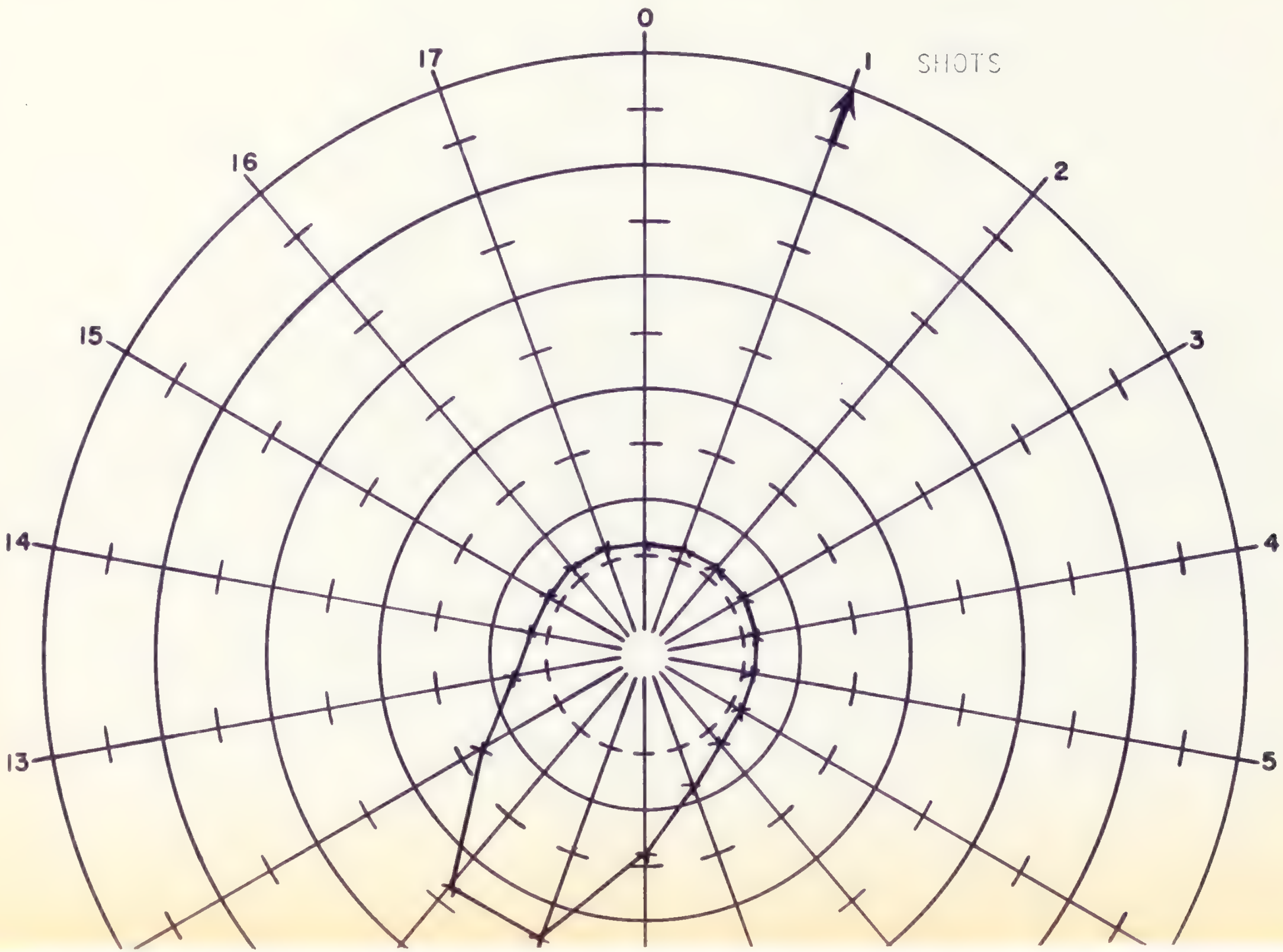


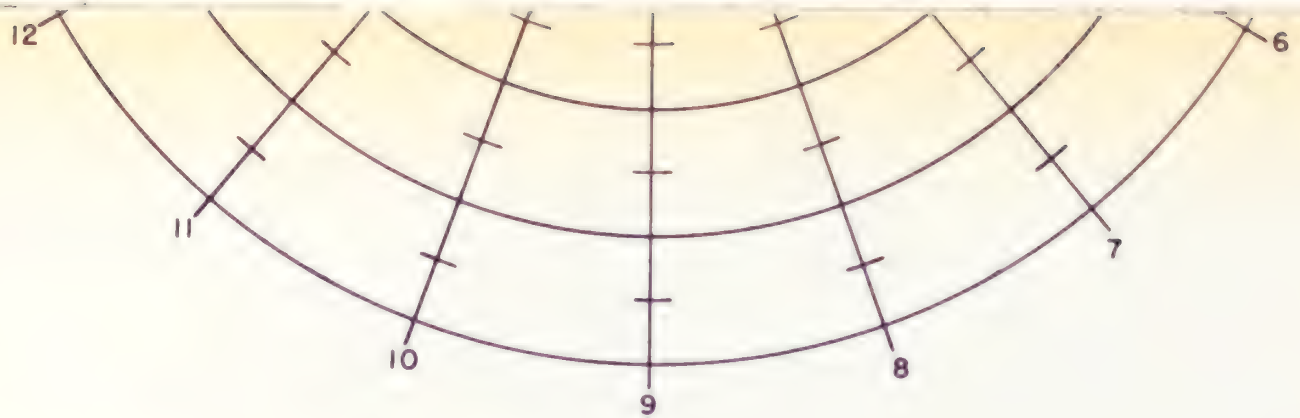
RADIORIENTATION PLOT

RADIORIENTATION PLOT

POT-B

NO. 1- [illegible] STRIP PERFORATED 1 [illegible] 1 [illegible]
NO. 1- [illegible] STRIP PERFORATED 1.[illegible] 1 TO ONE SHOT PER FOOT WITH 1 11/1[illegible] APERTURE





This chart, computation and or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with but subject to the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by [illegible] metal in the drill hole and other conditions unknown to us

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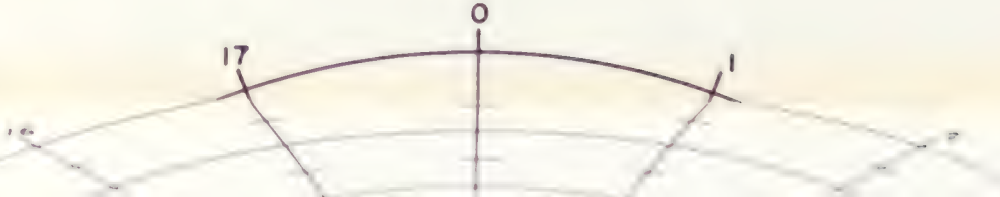
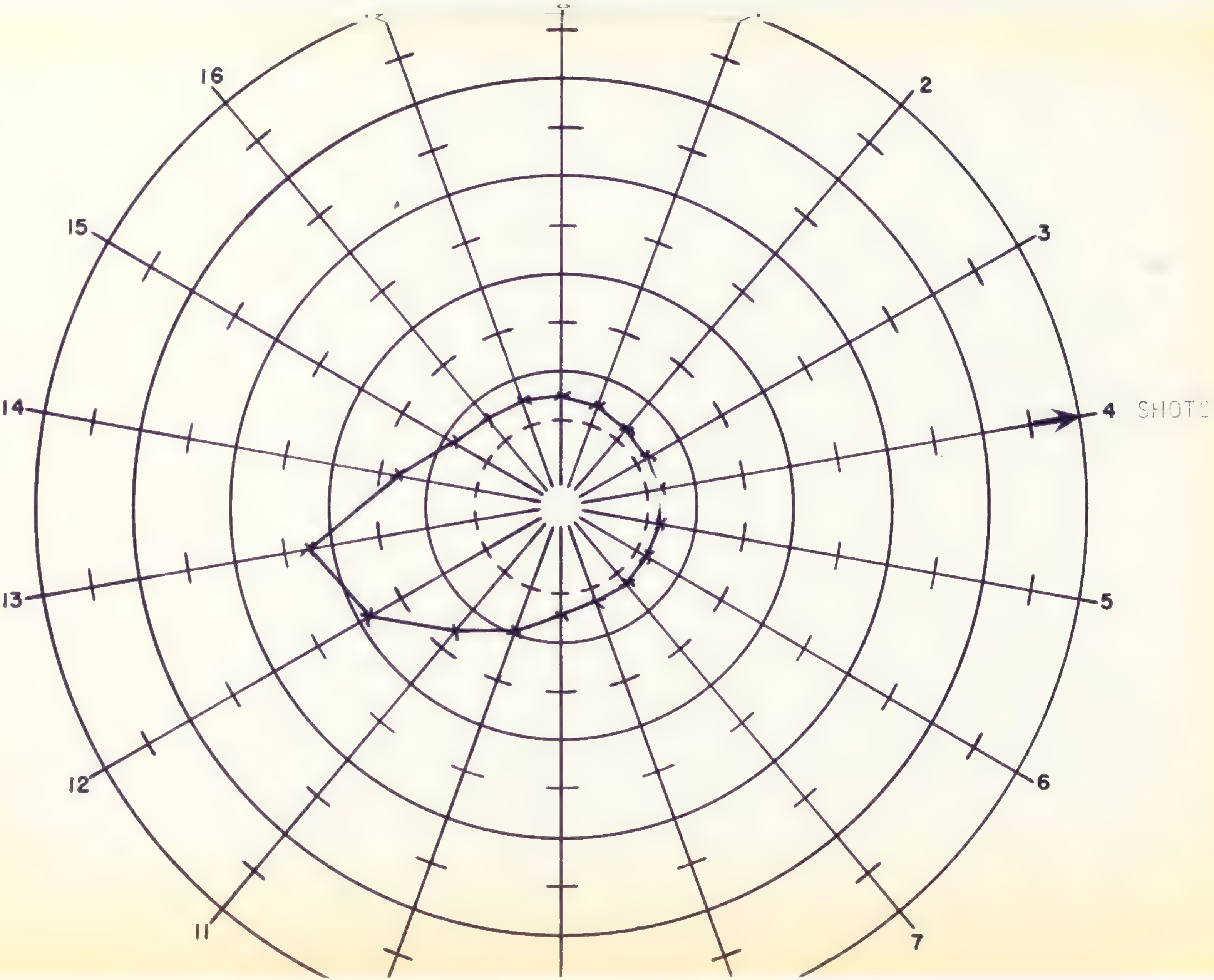
RADIORIENTATION PLOT

POT-B

[illegible]




16
2
15
3
14
4
SHOT
13
5
12
6
11
7

This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with but subject to the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are to be set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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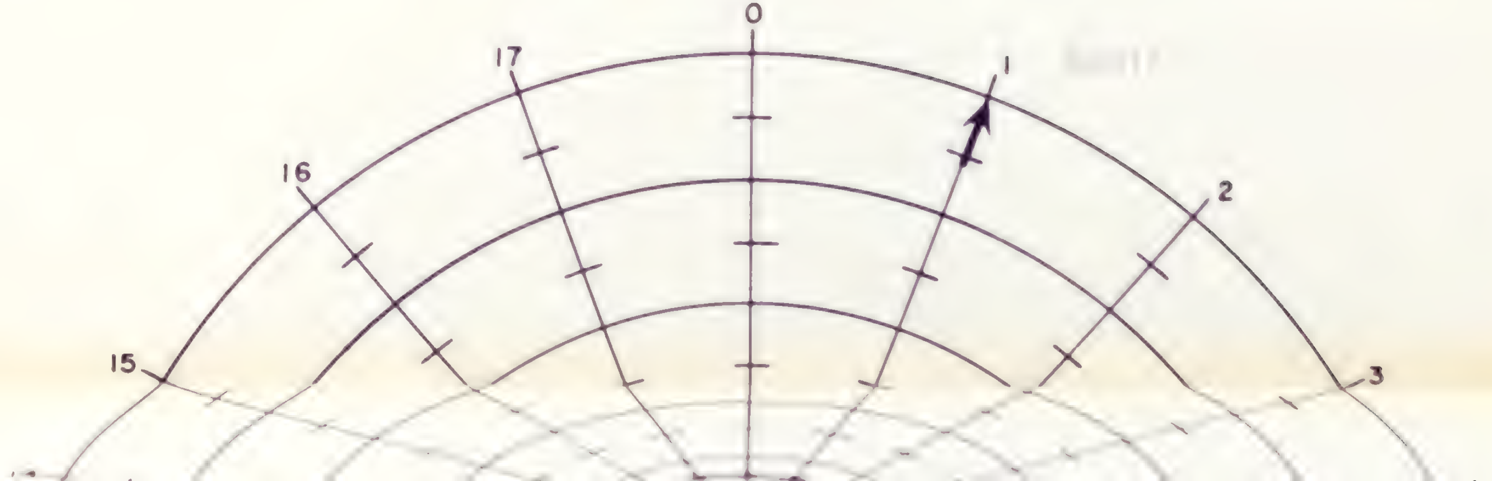
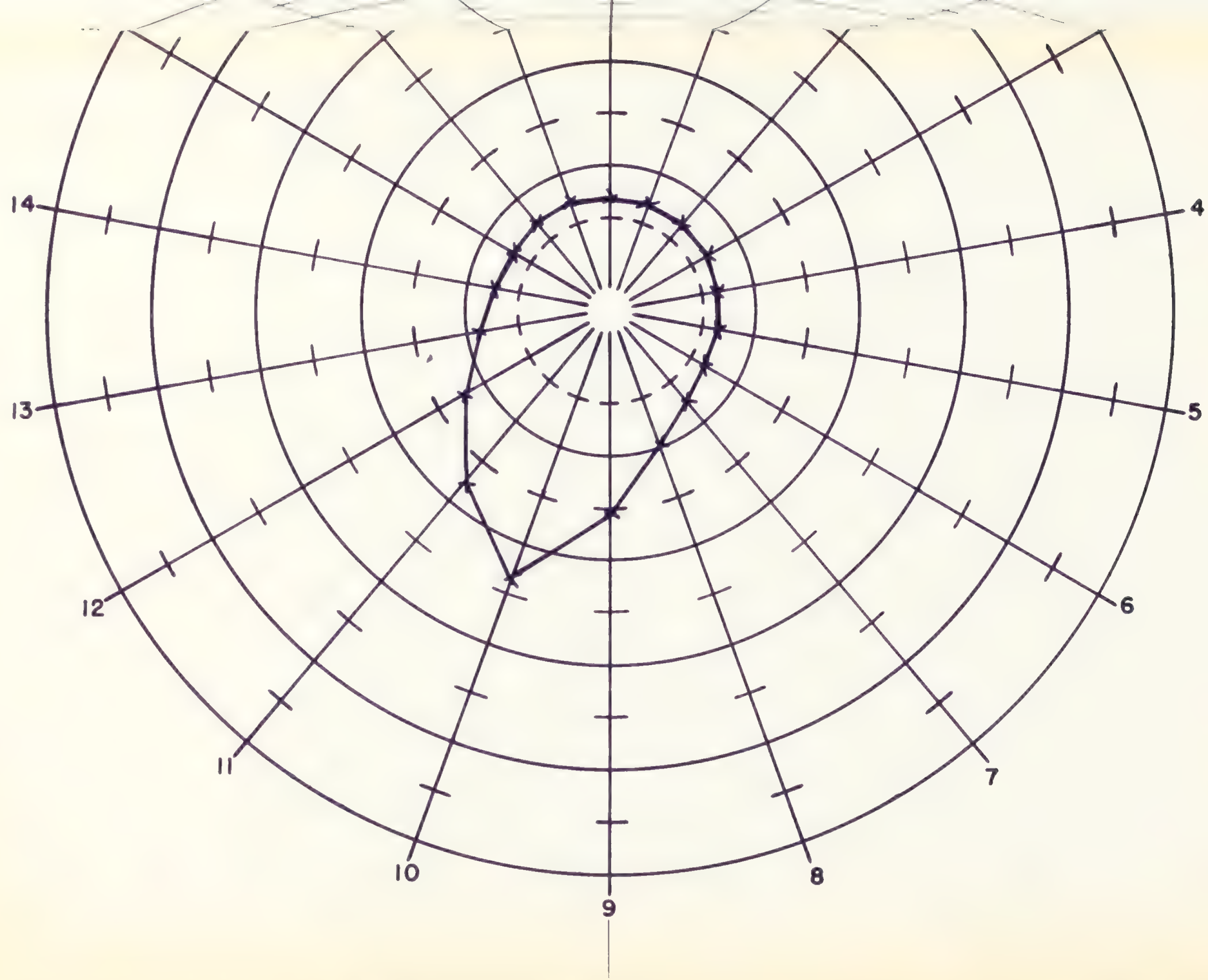
RADIORIENTATION PLOT

POT-B

[illegible]



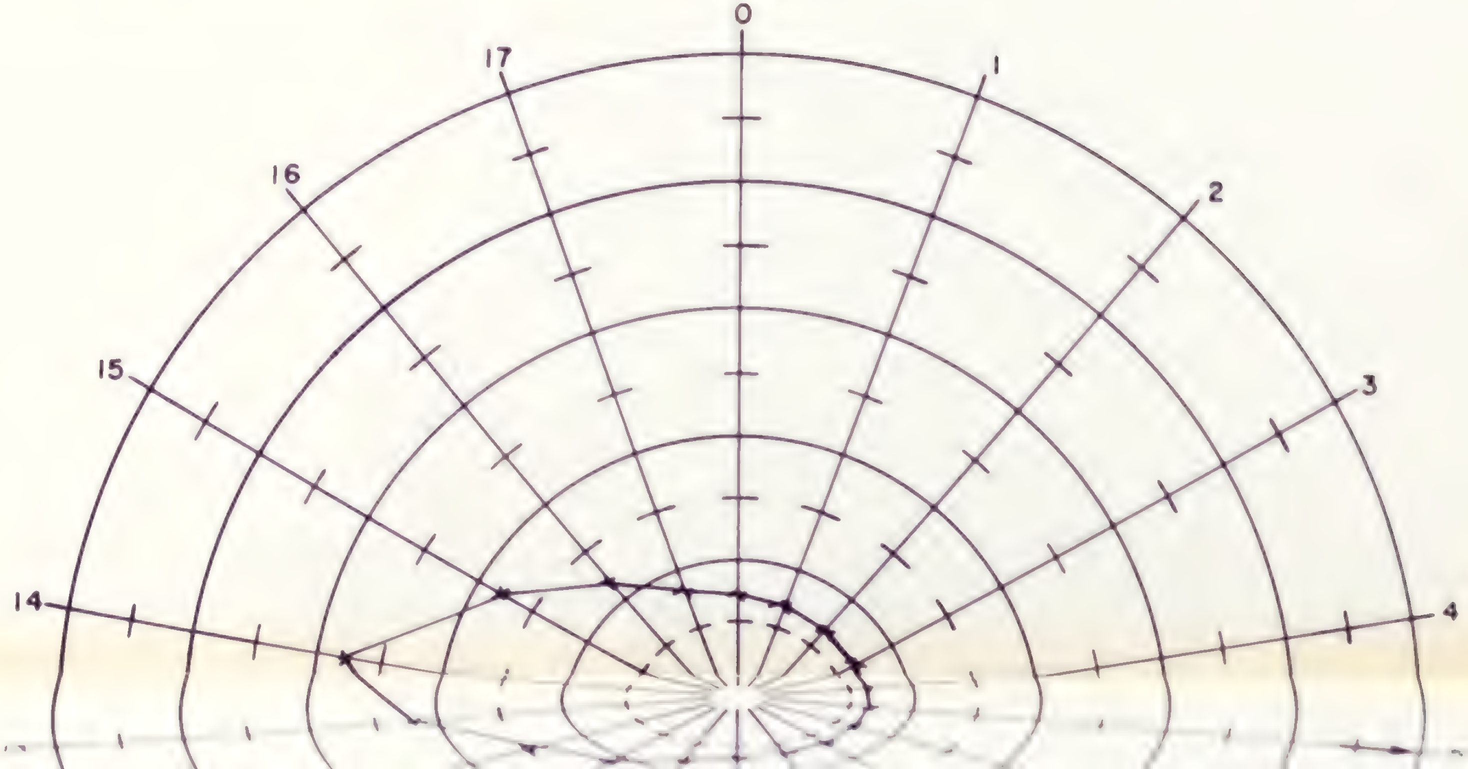


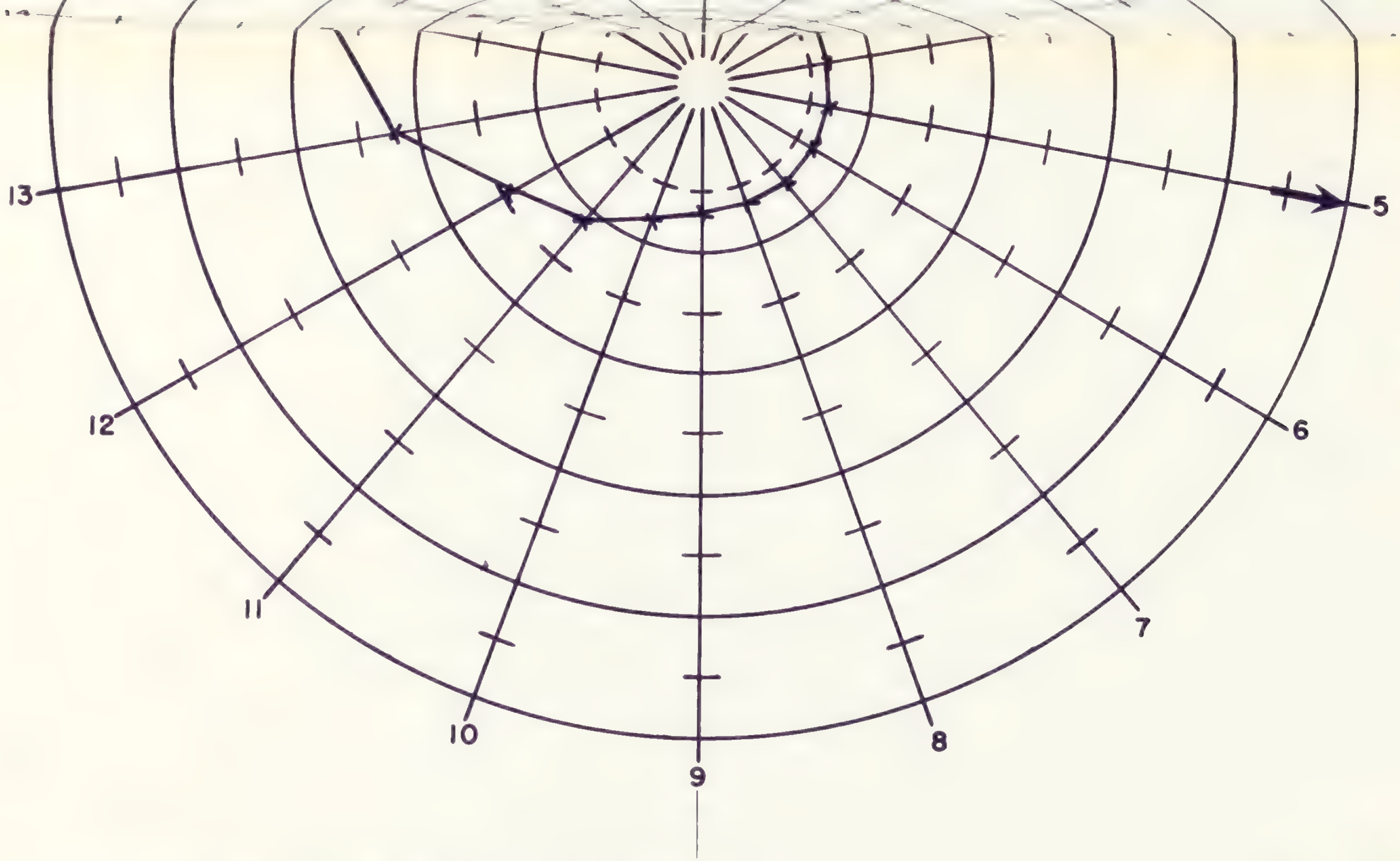
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse [illegible] Service Order for this job. The readings could be adversely affected by vagrant metal in the

Schlumberger

RADIORIENTATION PLOT

POT-B





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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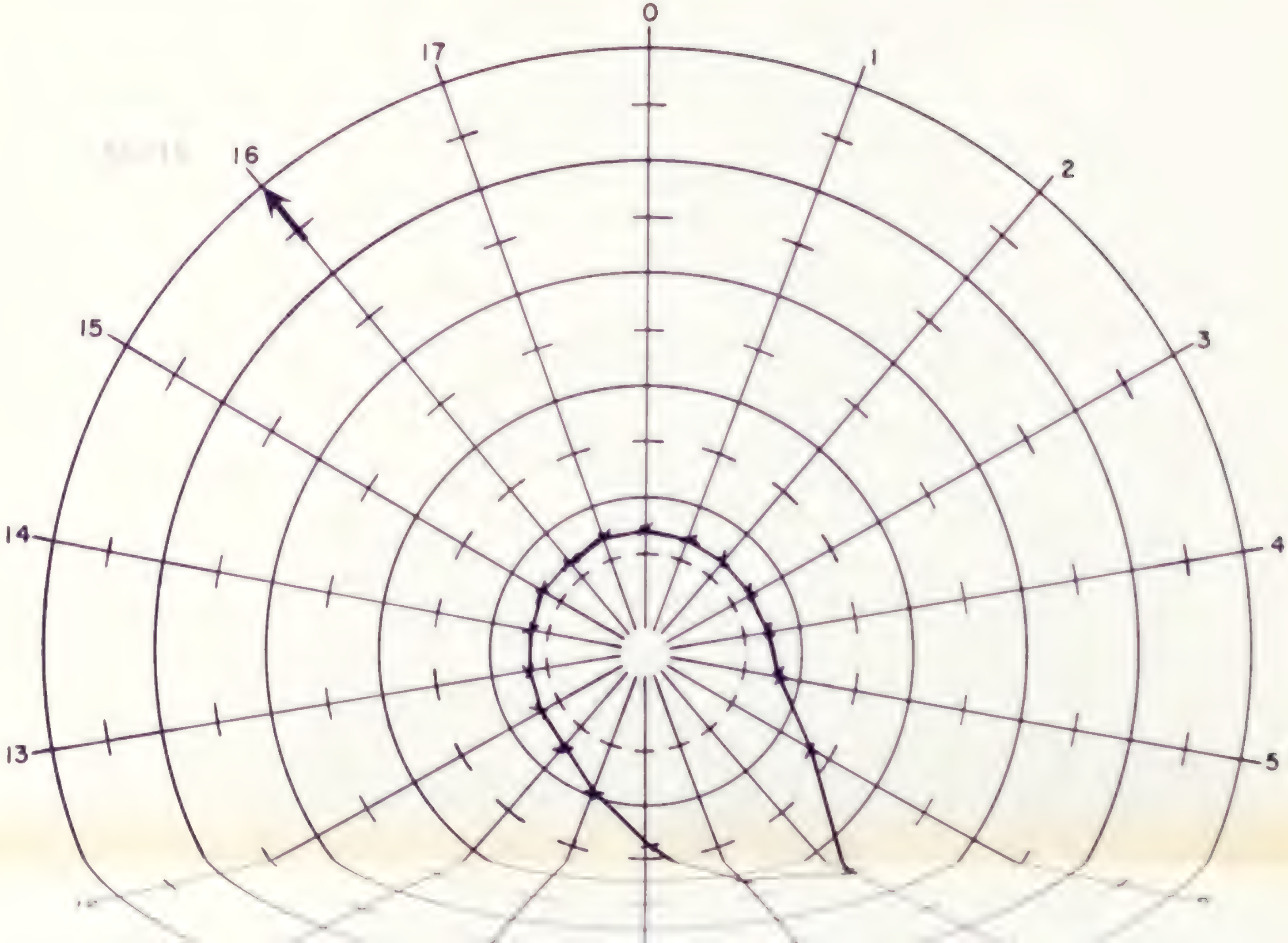
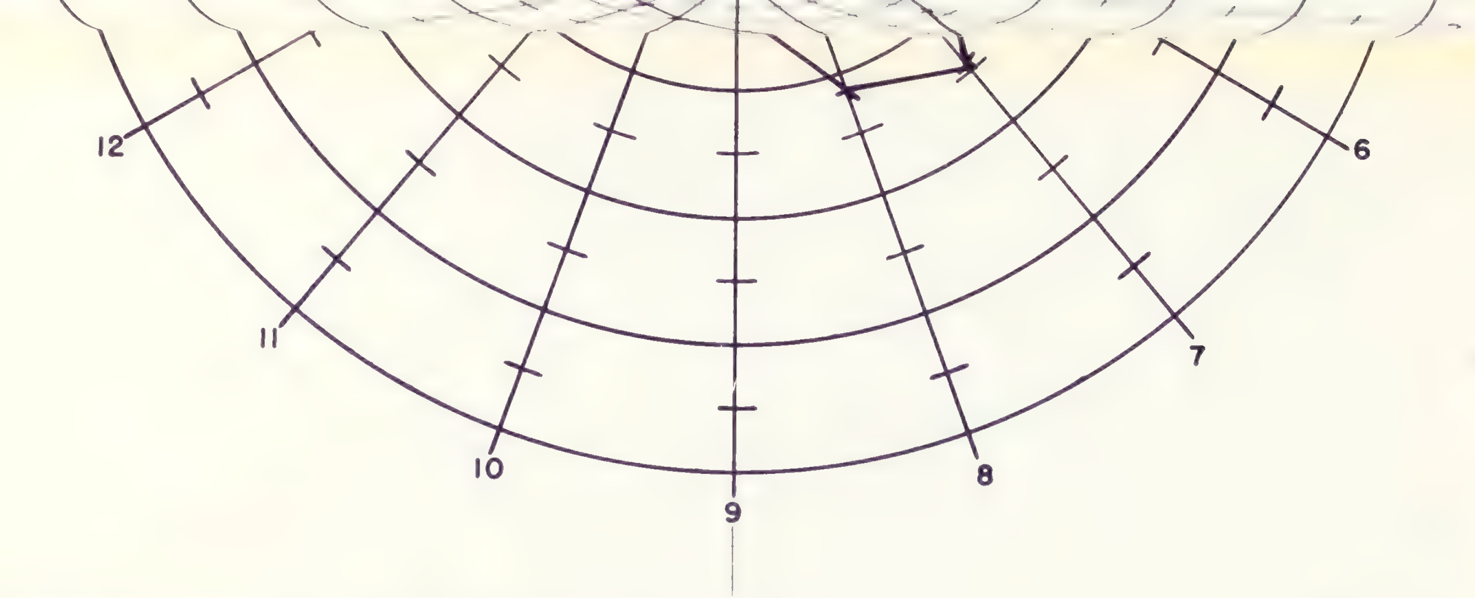
RADIORIENTATION PLOT

POT-B





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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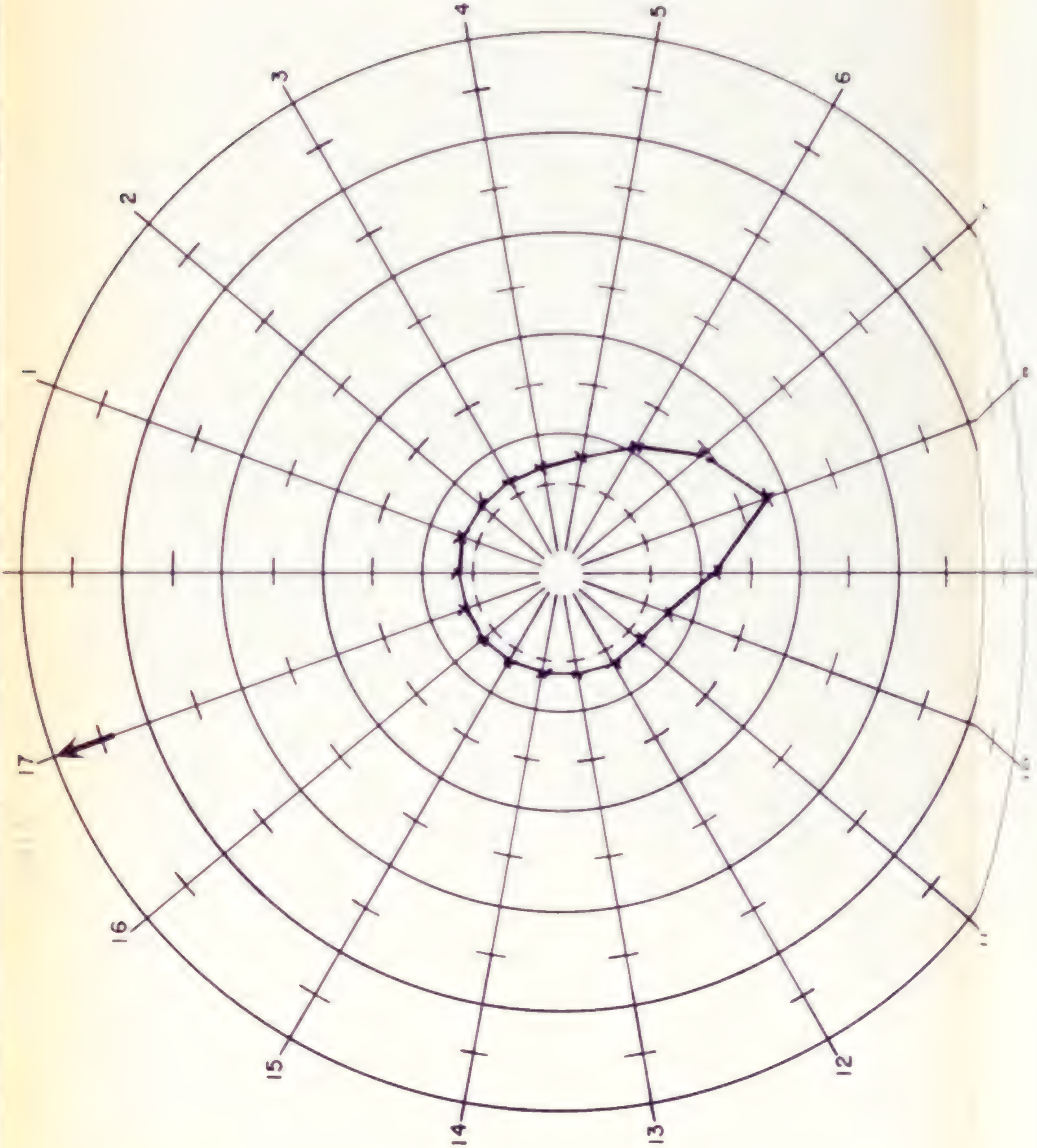
RADIORIENTATION PLOT

POT-B

[illegible] STRING PERFORATED 1157-1167 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

0


1
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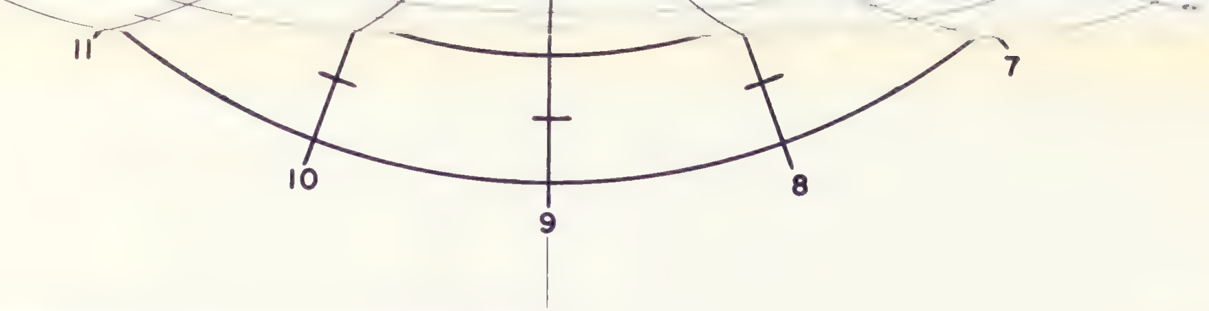
17



This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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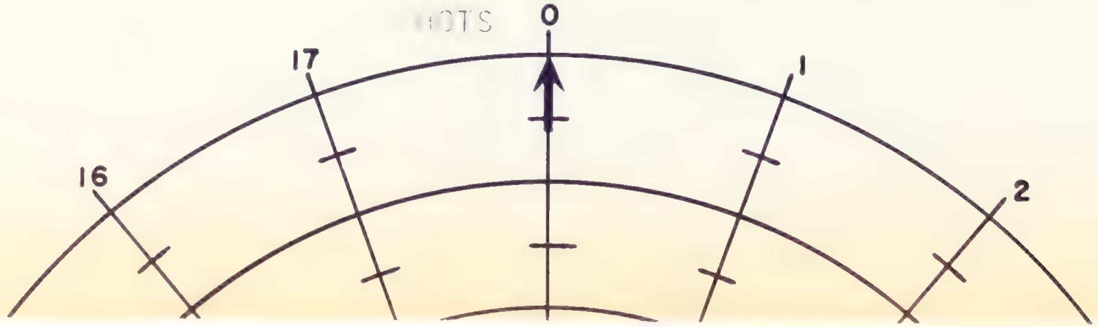
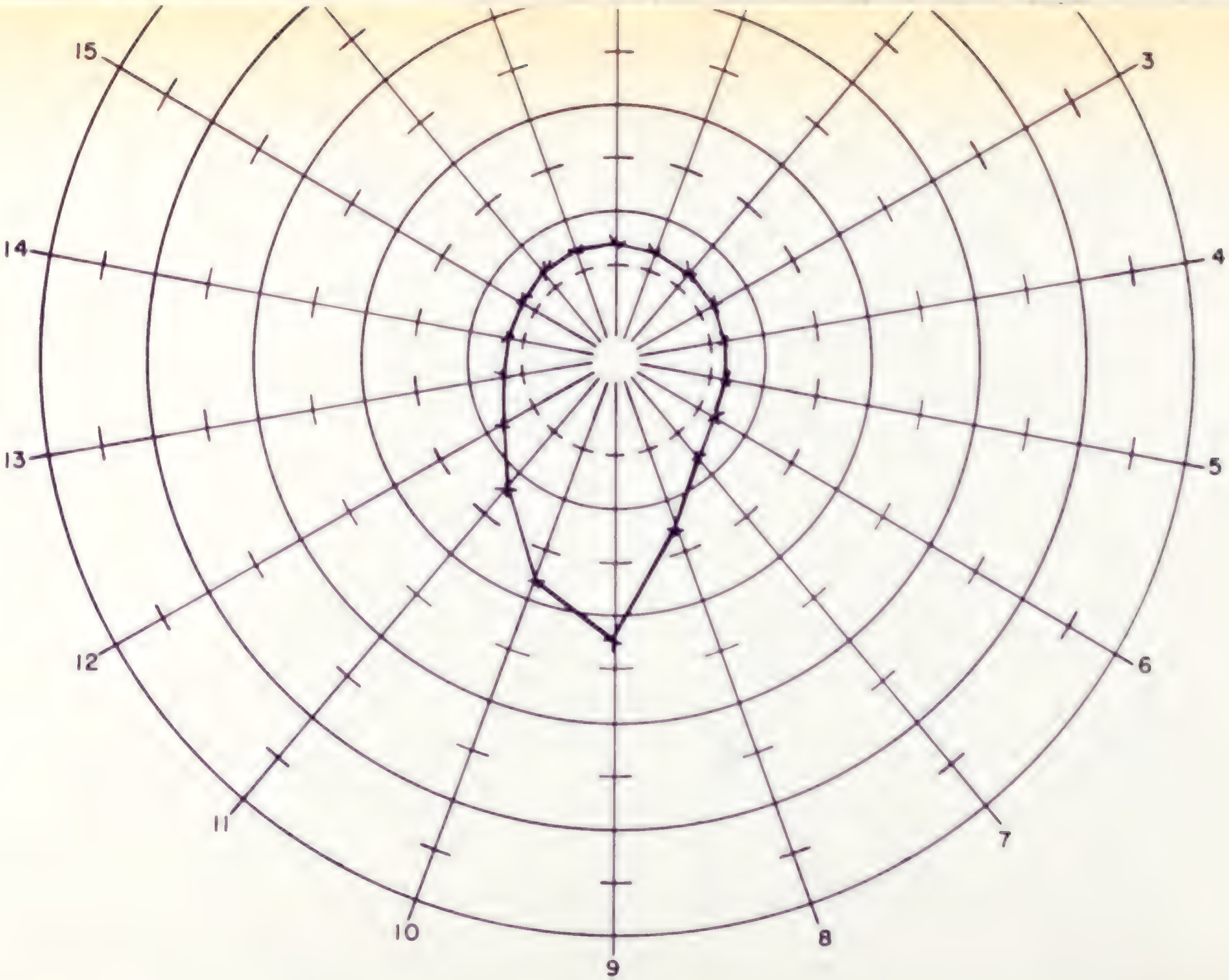
RADIORIENTATION PLOT

POT-B

NO.1- SUB STRING-PERFORATED 1146-1156 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





[illegible]

Schlumberger

This chart, computation and, or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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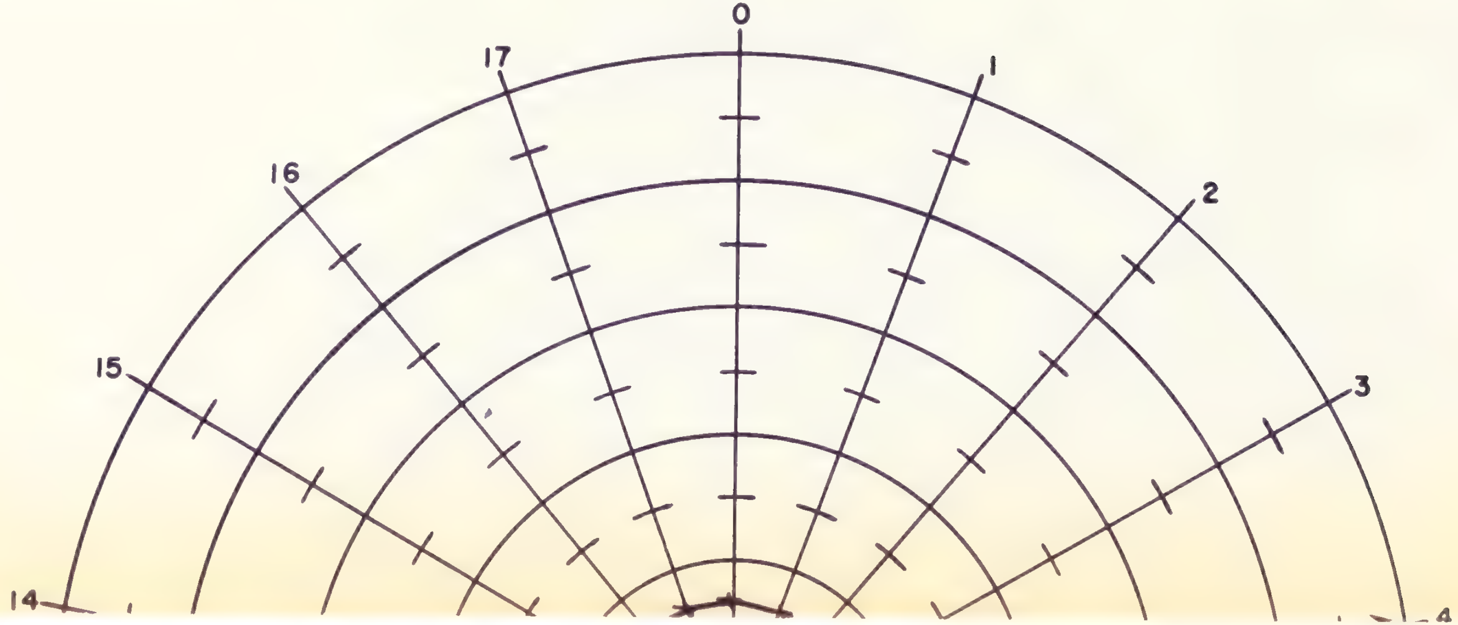
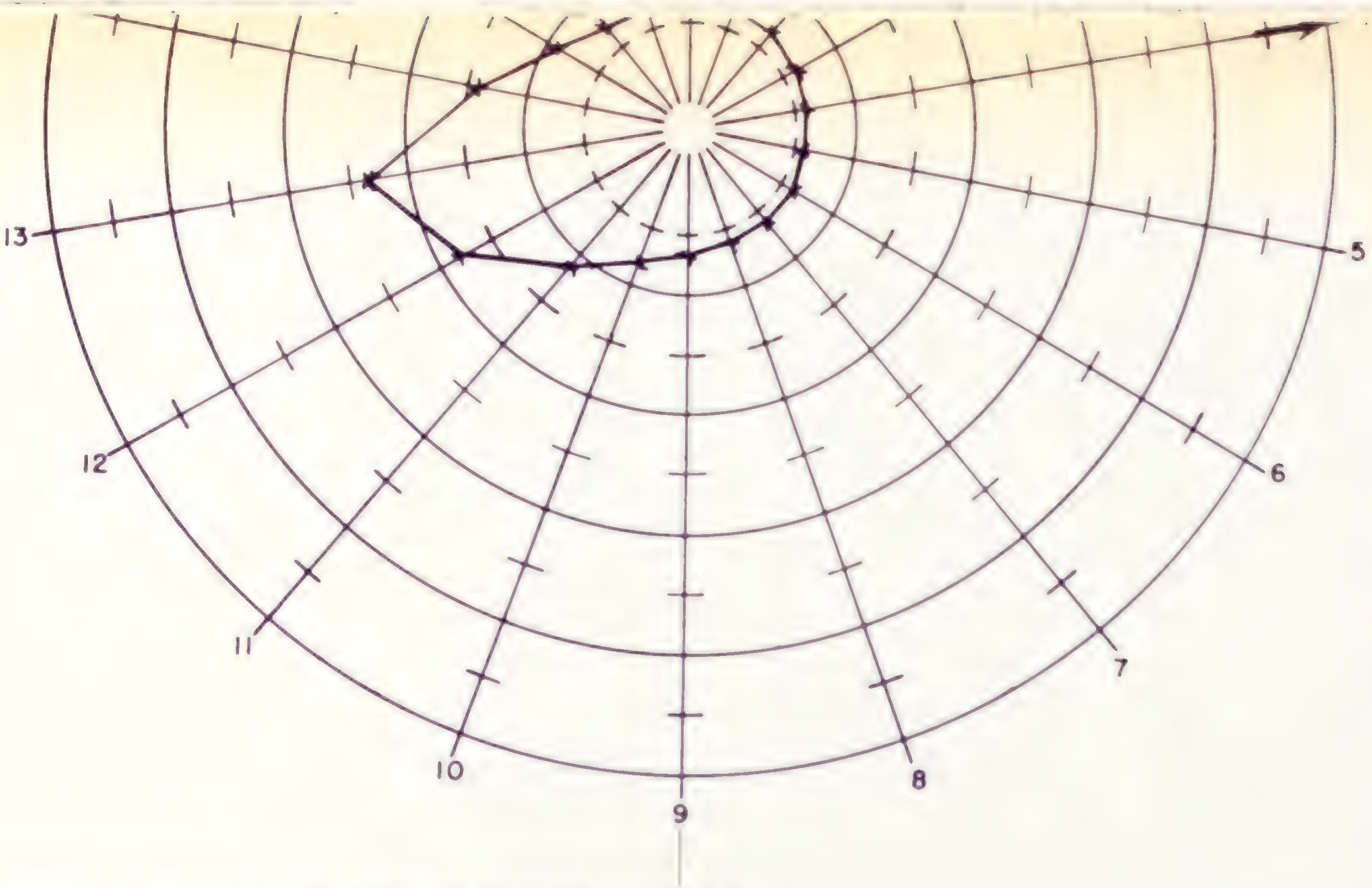
RADIORIENTATION PLOT

POT-B

NO.1 [illegible] PERFORATE 1104-1114 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma [illegible] and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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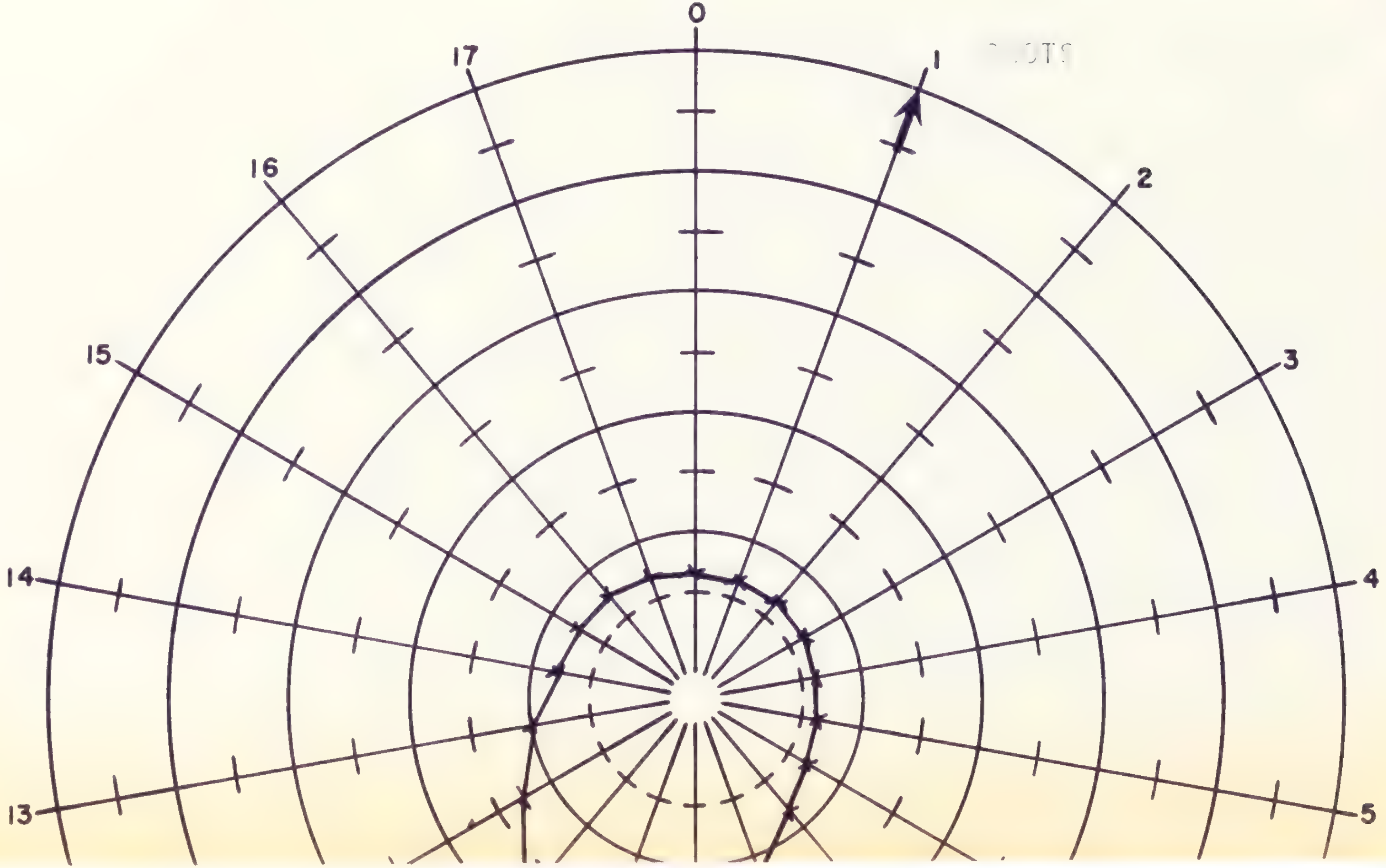
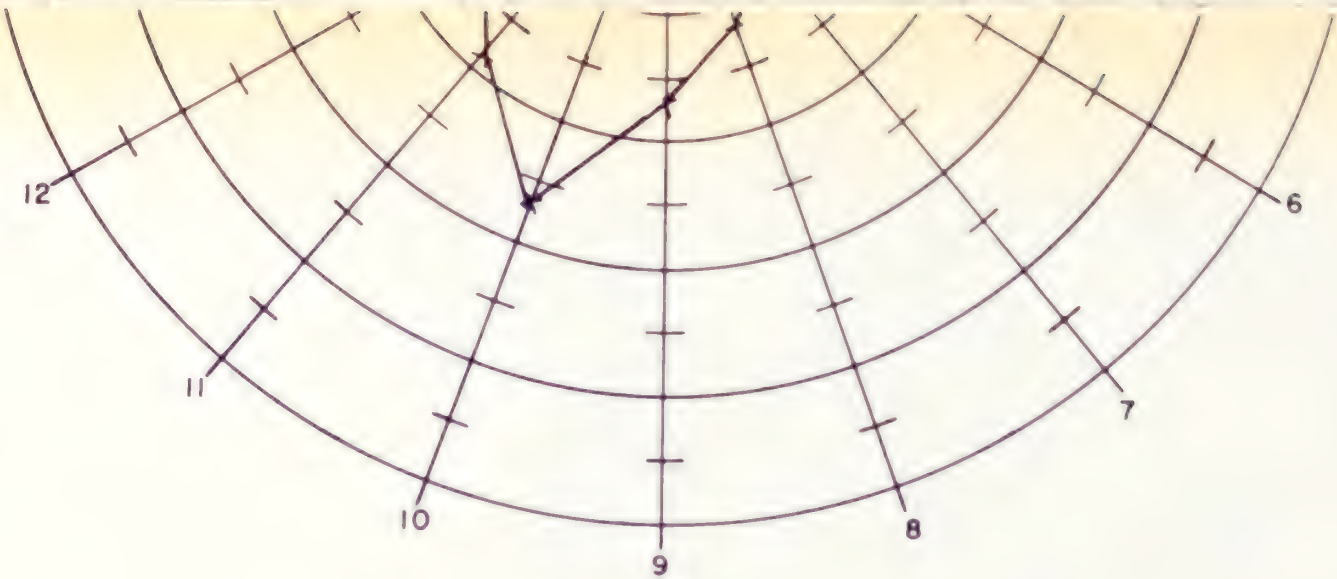
RADIORIENTATION PLOT

RADIORIENTATION PLOT

POT-B

[illegible] STRI[illegible]-PERFORATED 10/3-110, [illegible] SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule (or which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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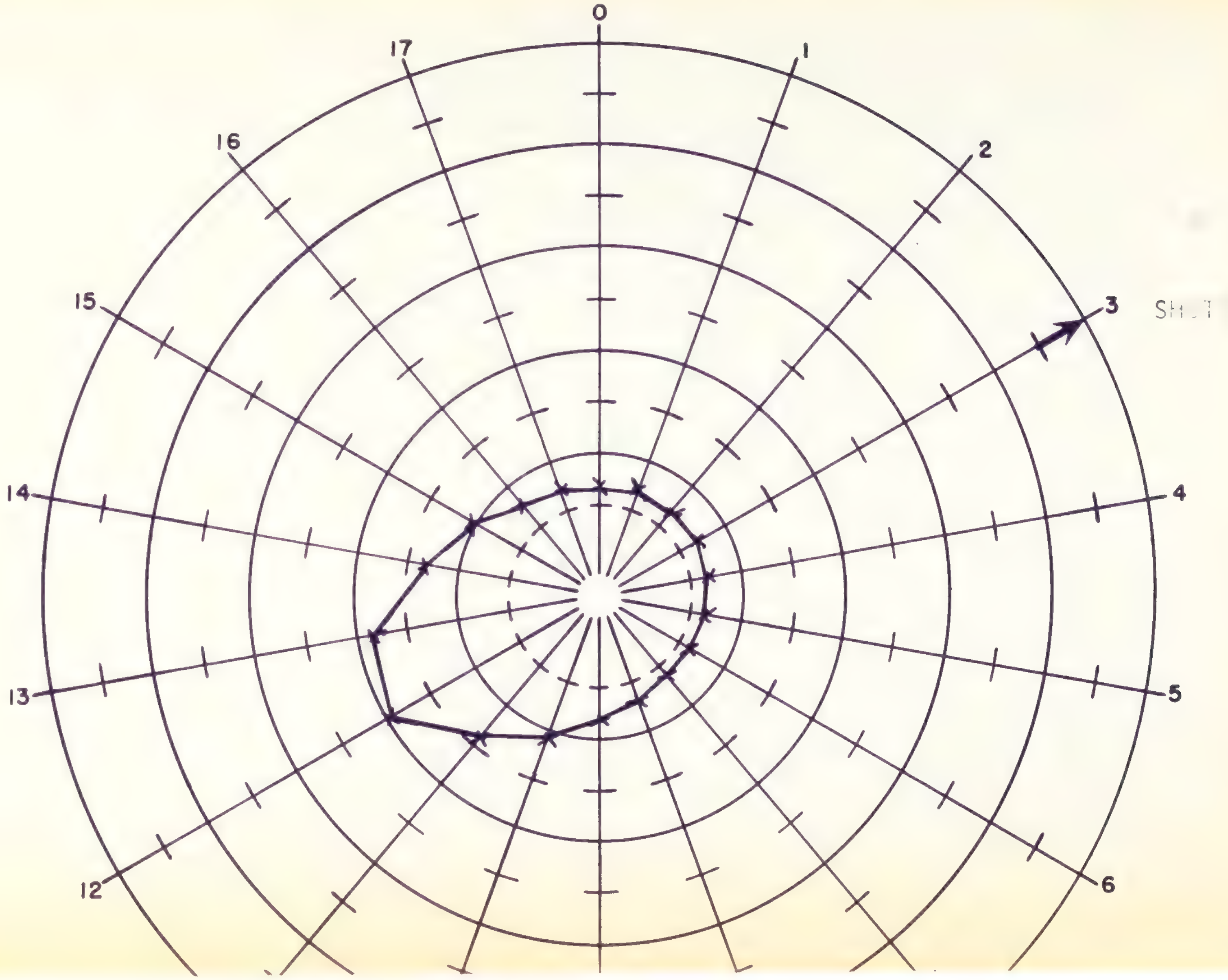
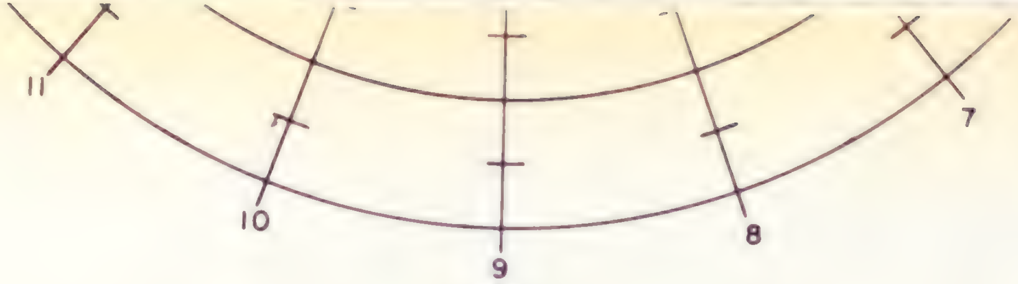
RADIORIENTATION PLOT

POT-B

RADIORIENTATION PLOT

POT B



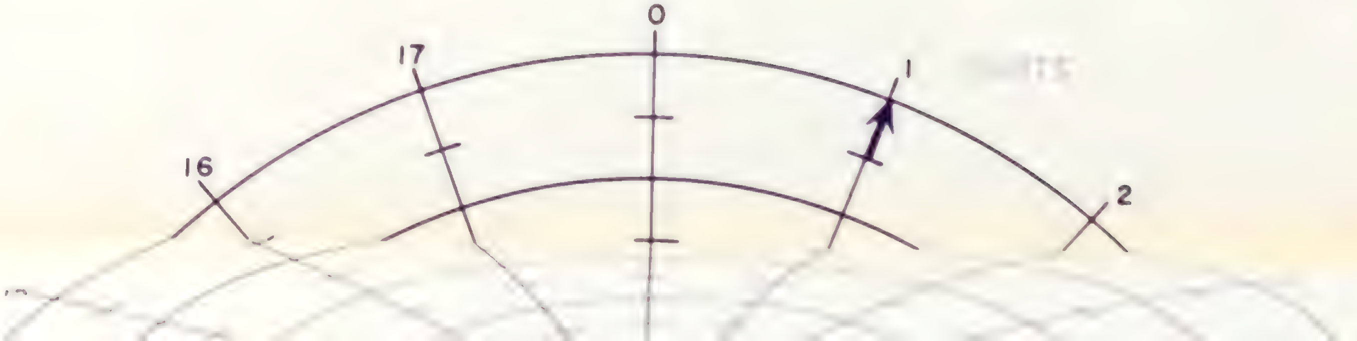


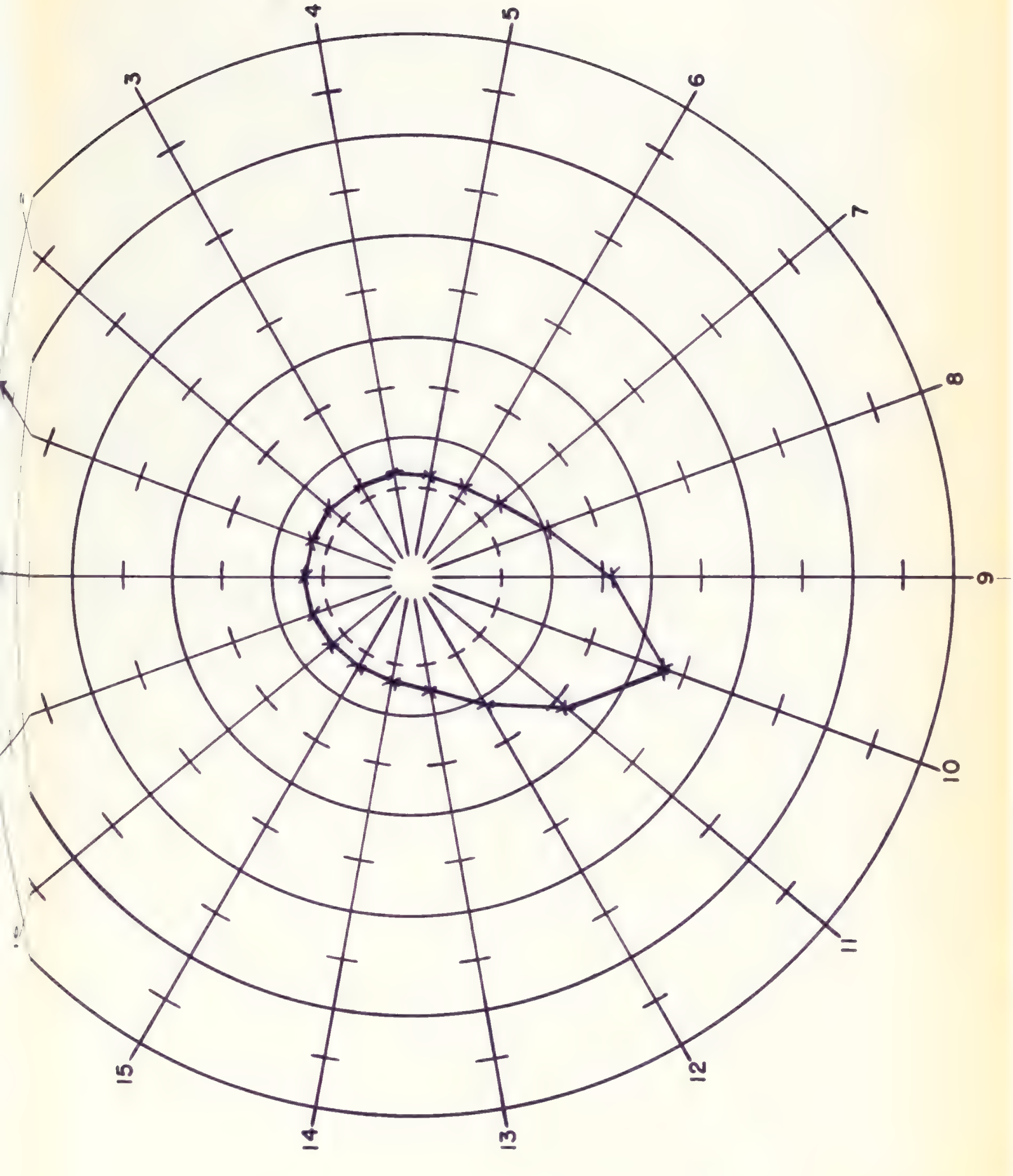
This chart, computation and or interpretation of our readings from our gamma-gamma [illegible] and [illegible] tecting instrument is presented to you in [illegible] with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are [illegible] on the reverse side of our Service Order for this job. The readings [illegible] be adversely affected by [illegible] in the drill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B




3
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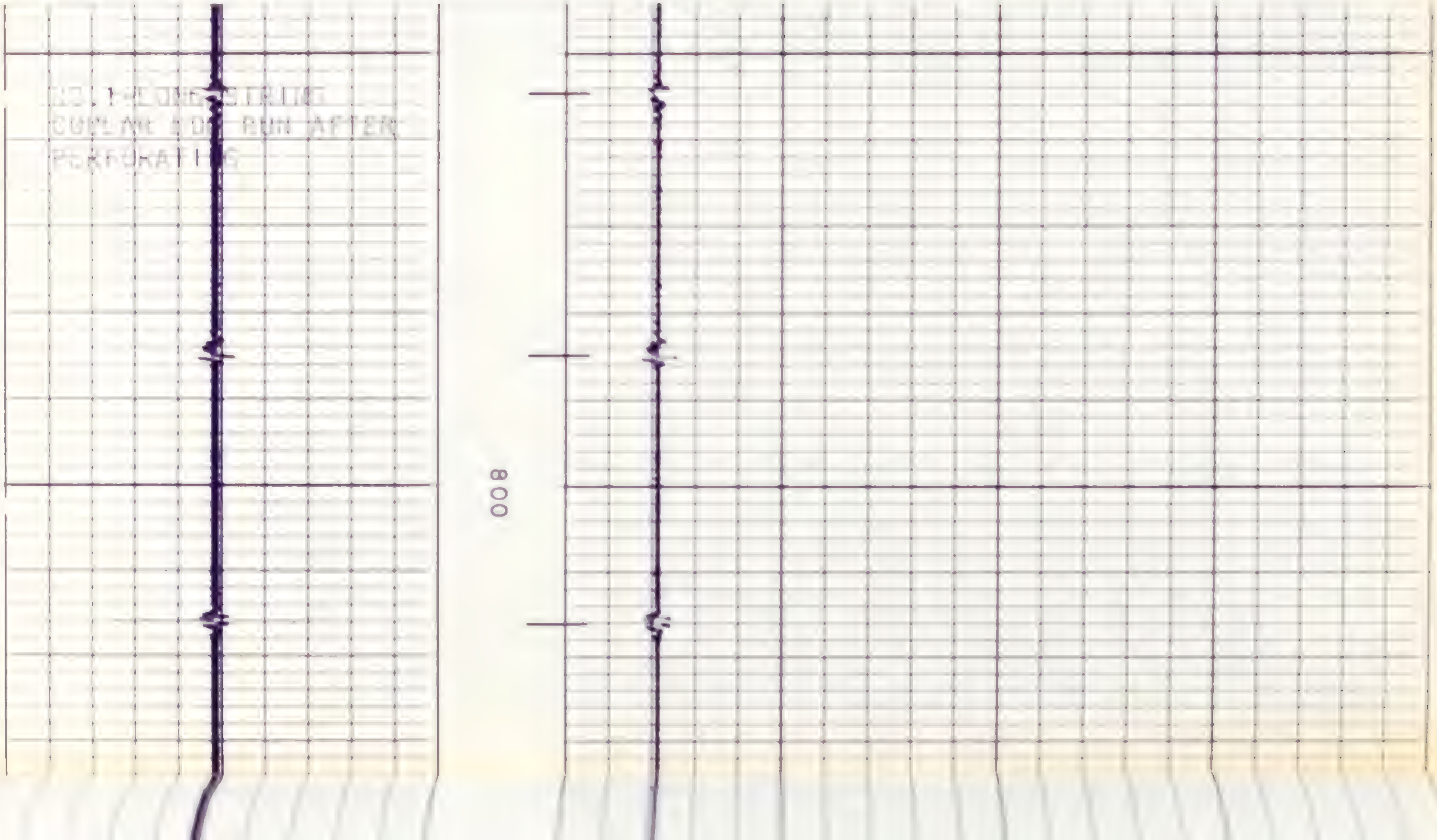
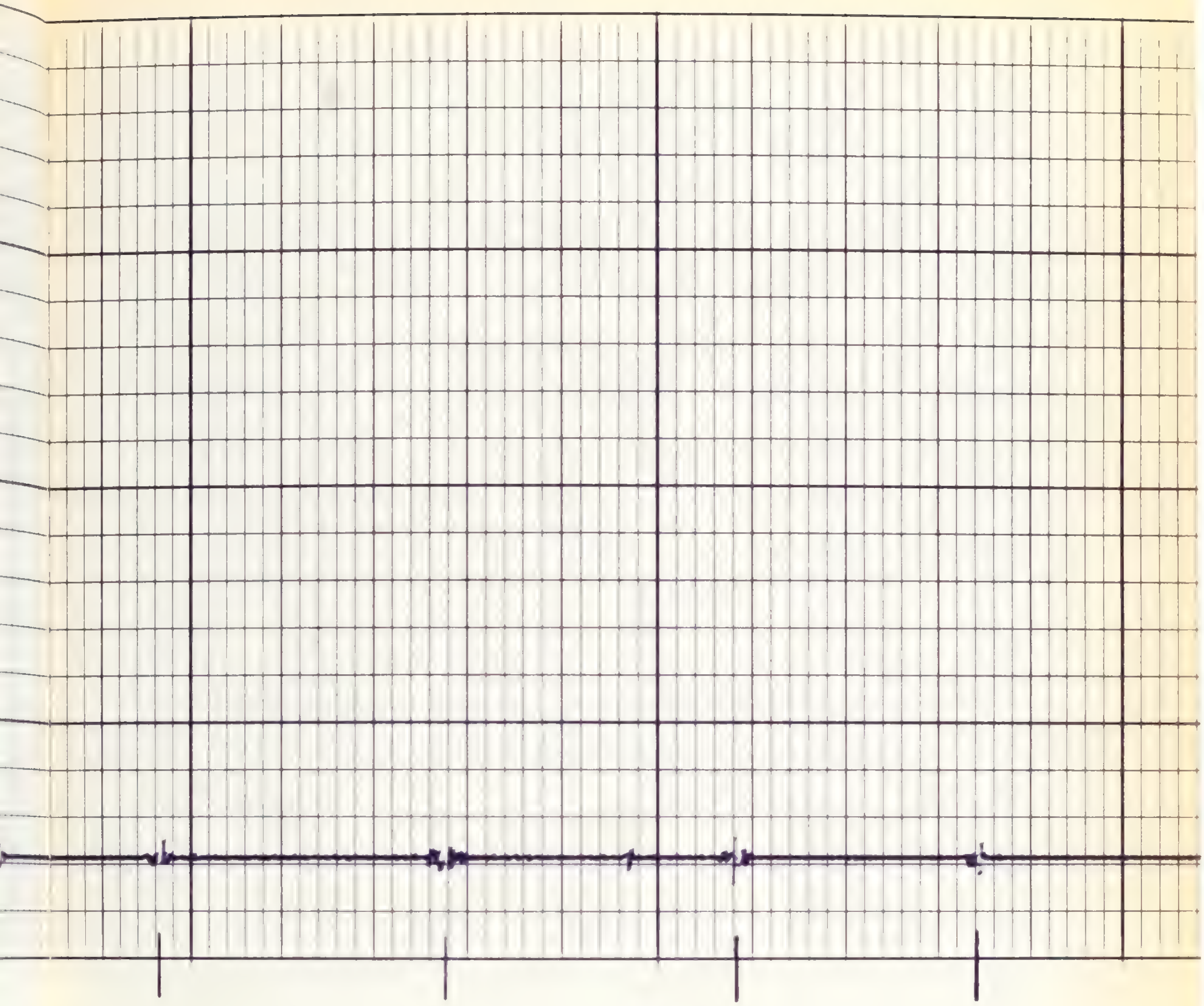
This chart, computation and or interpretation of our readings from our gamma-gamma correlation and/or testing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by residual metal in the drill hole and other conditions unknown to us.

Schlumberger





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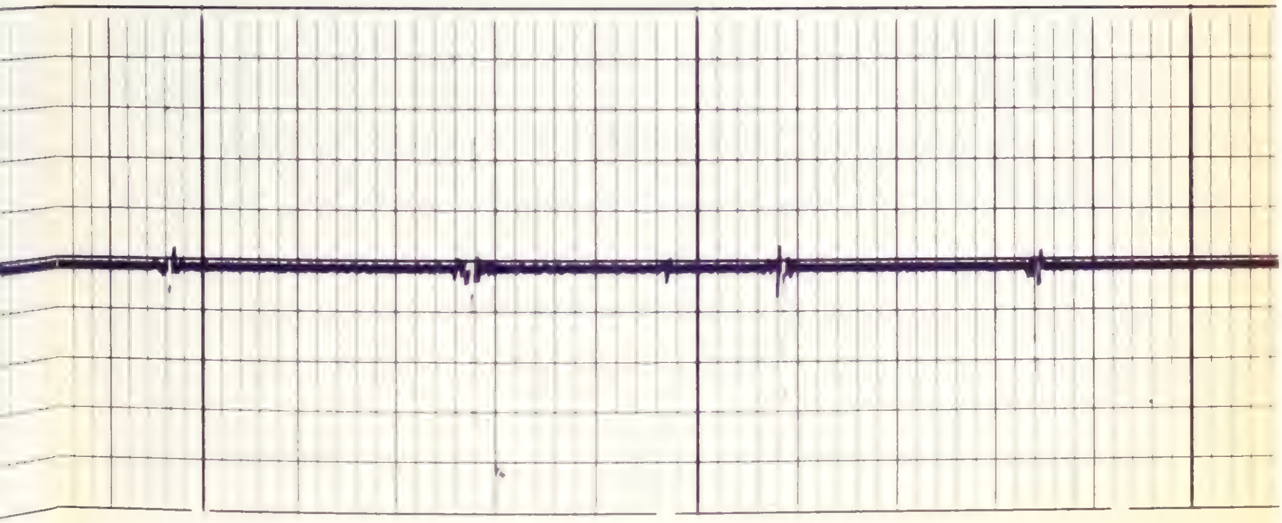

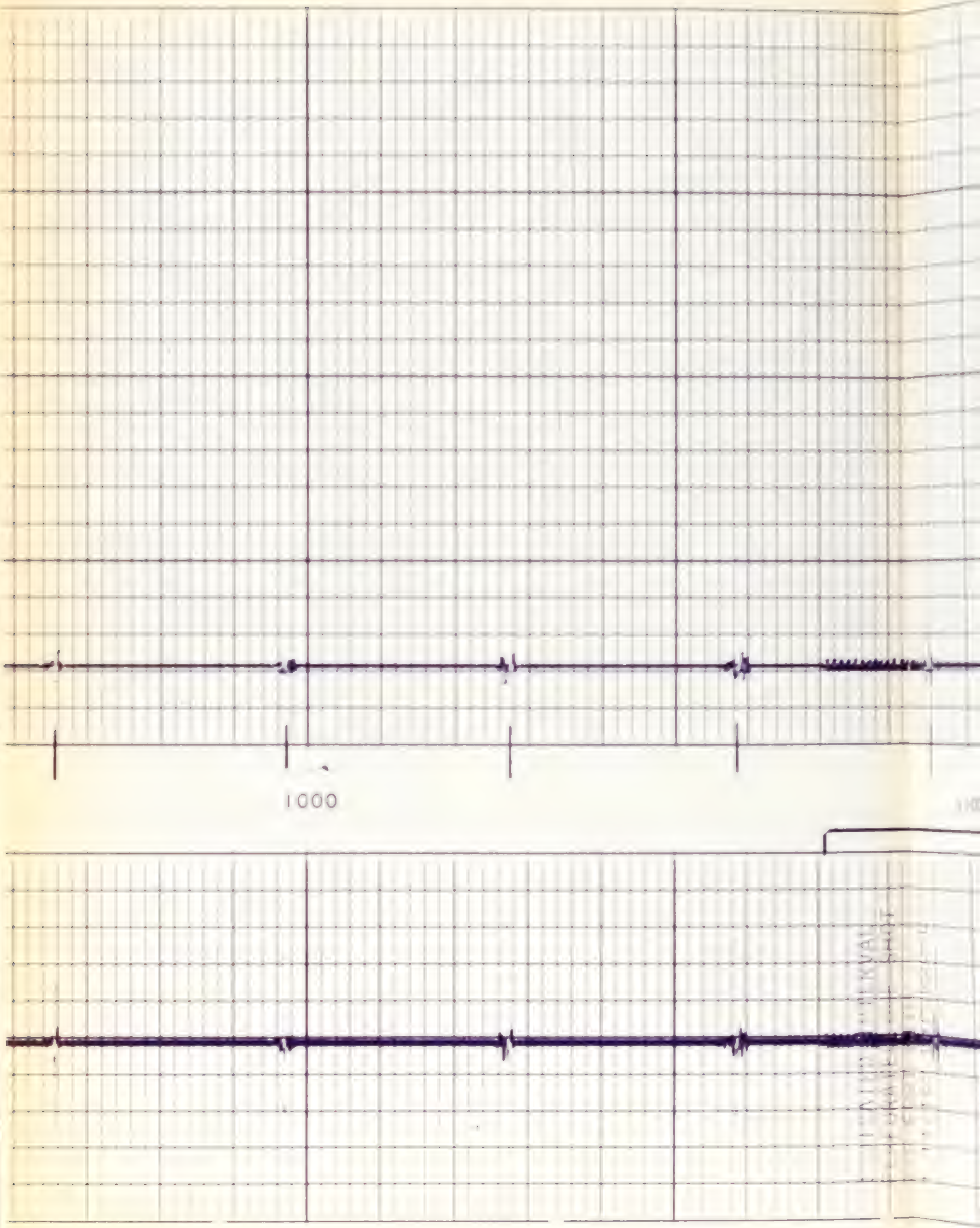
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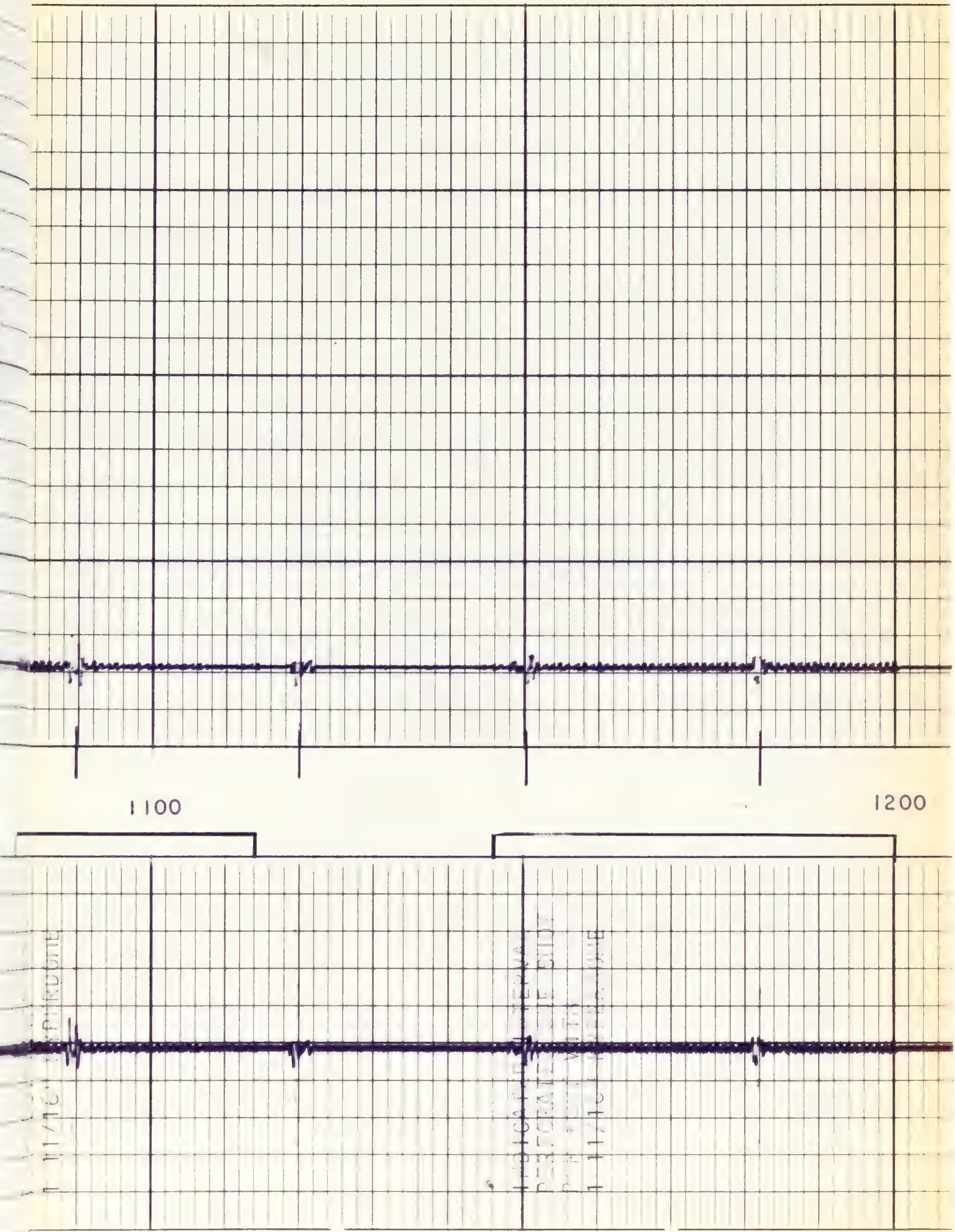
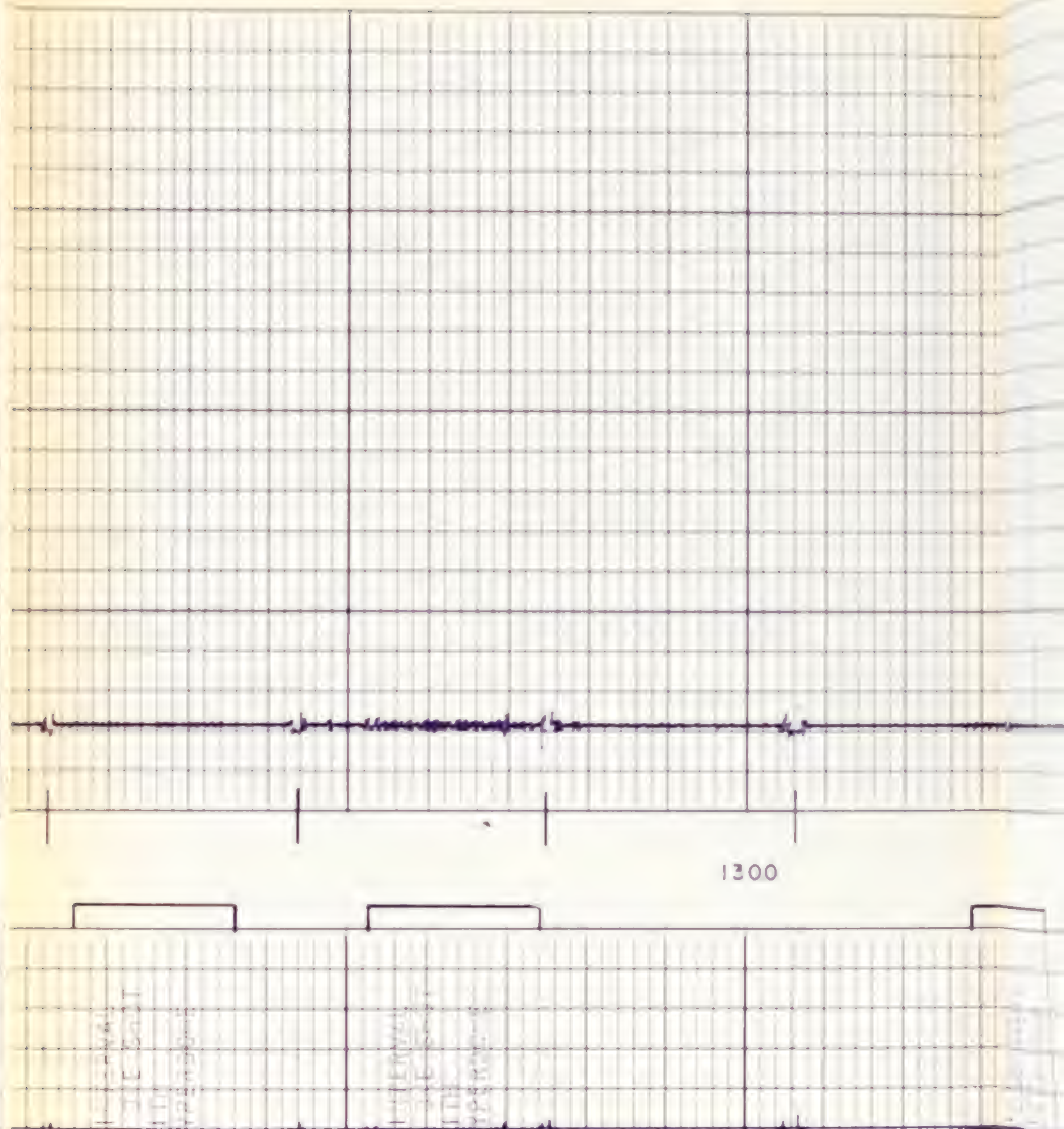


1100
1200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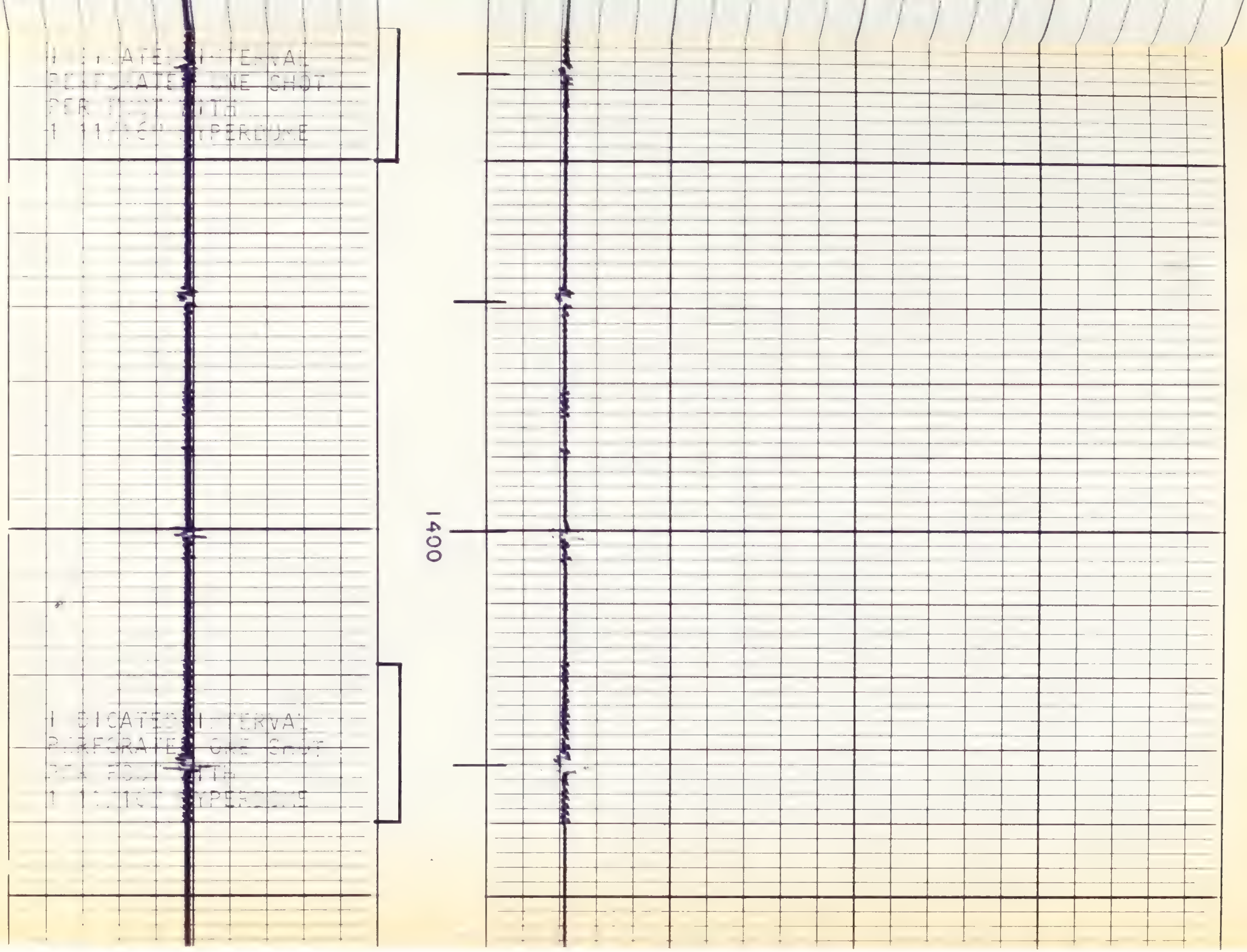
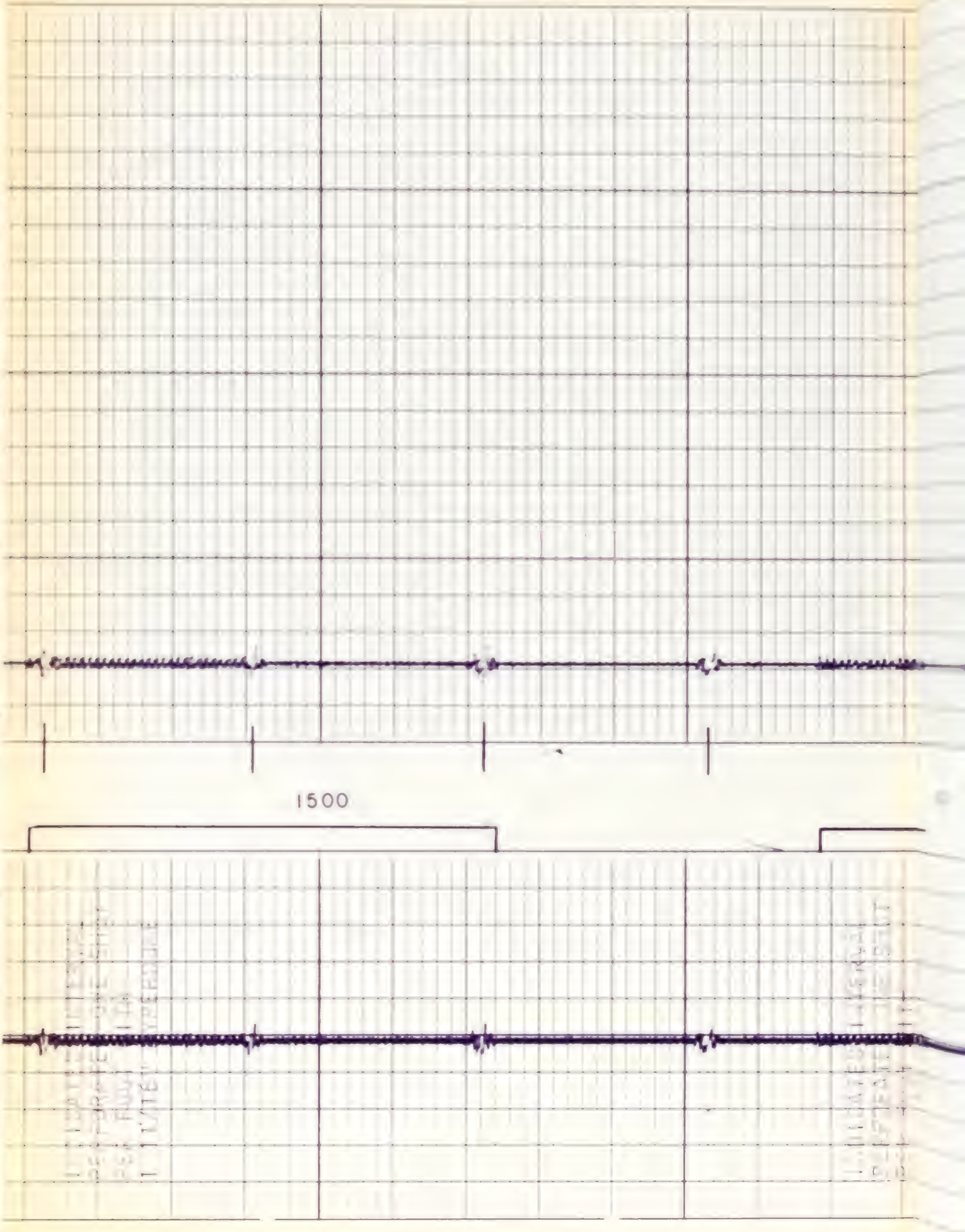

INDICATES INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
1400
INDICATES INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME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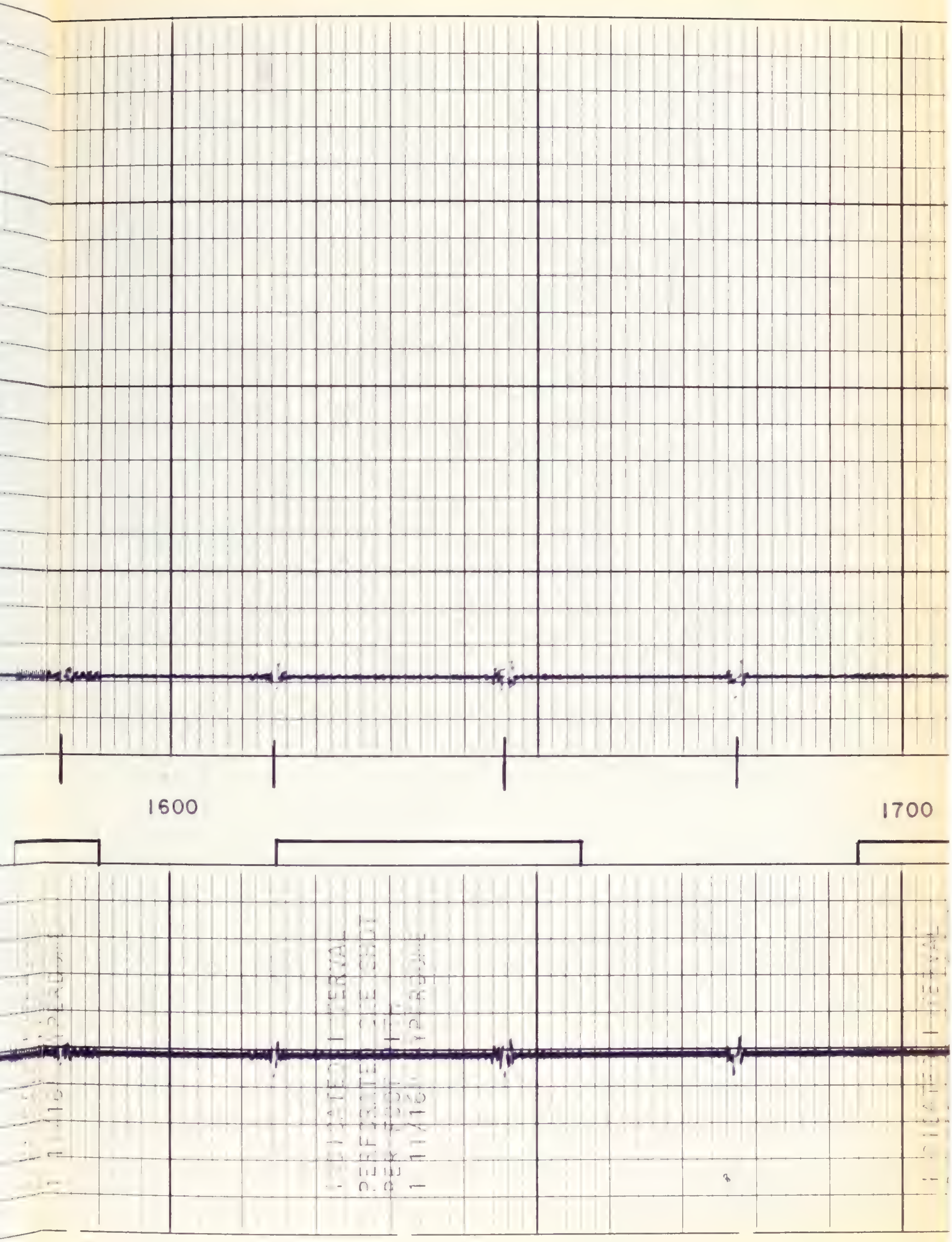
1600
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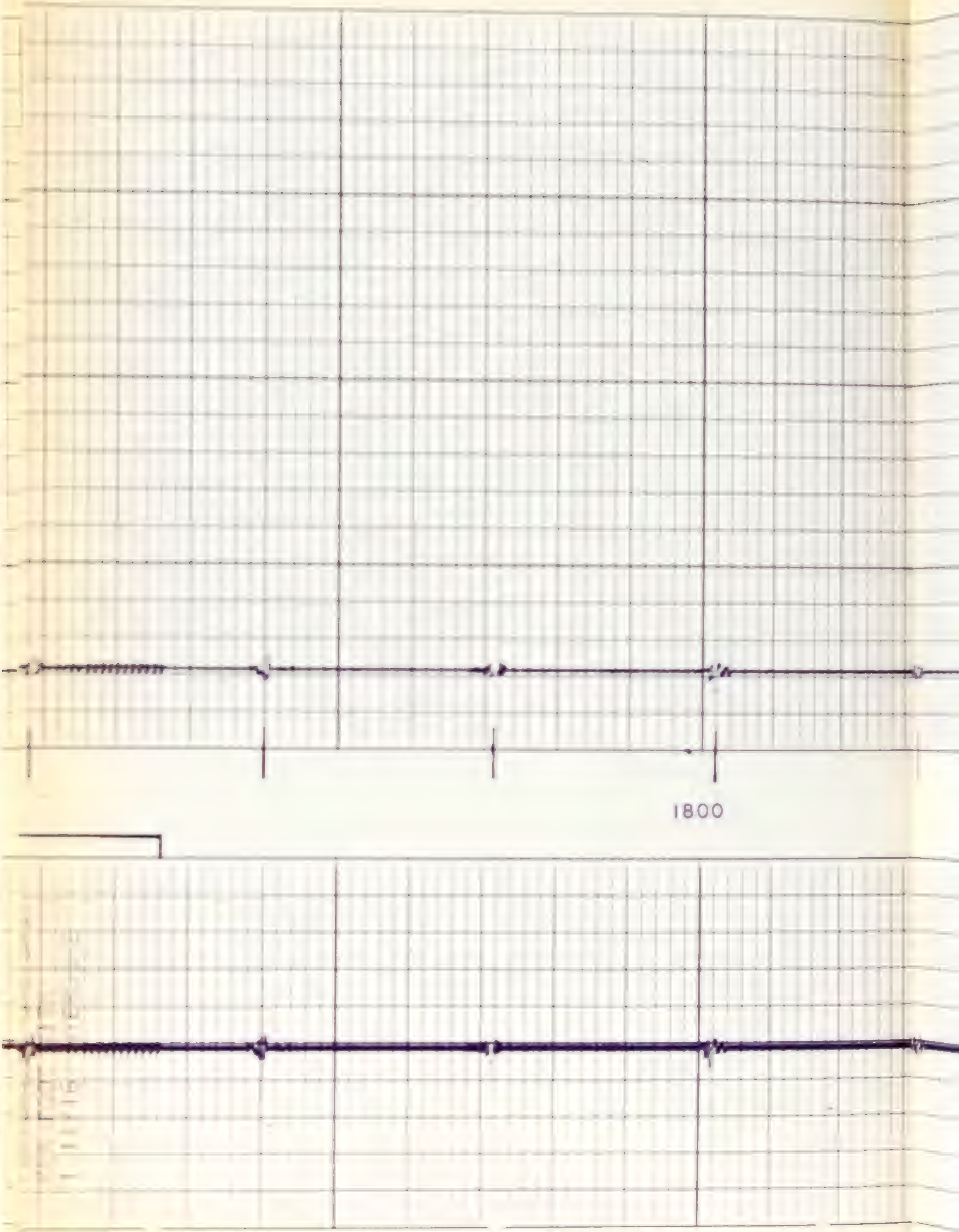
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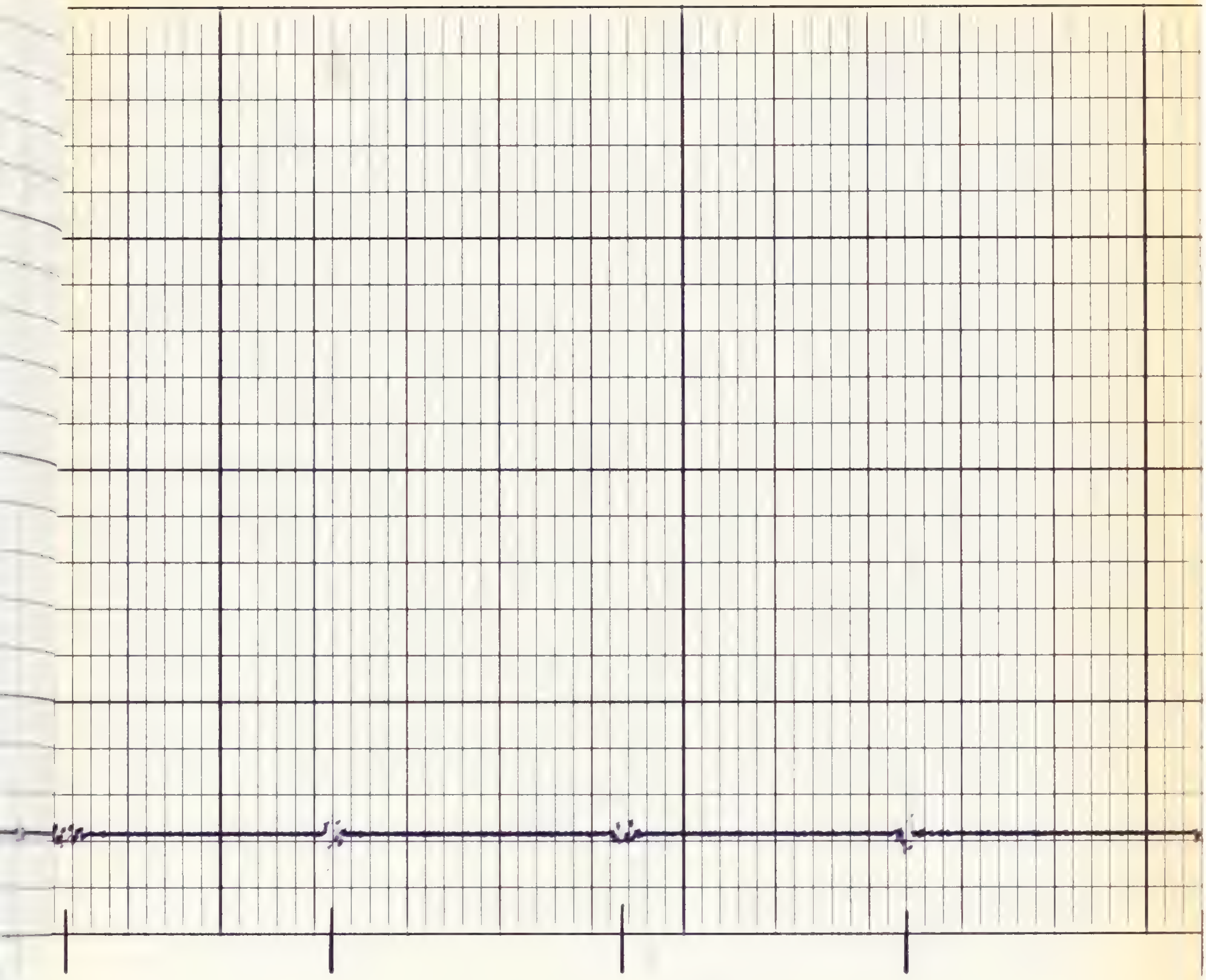

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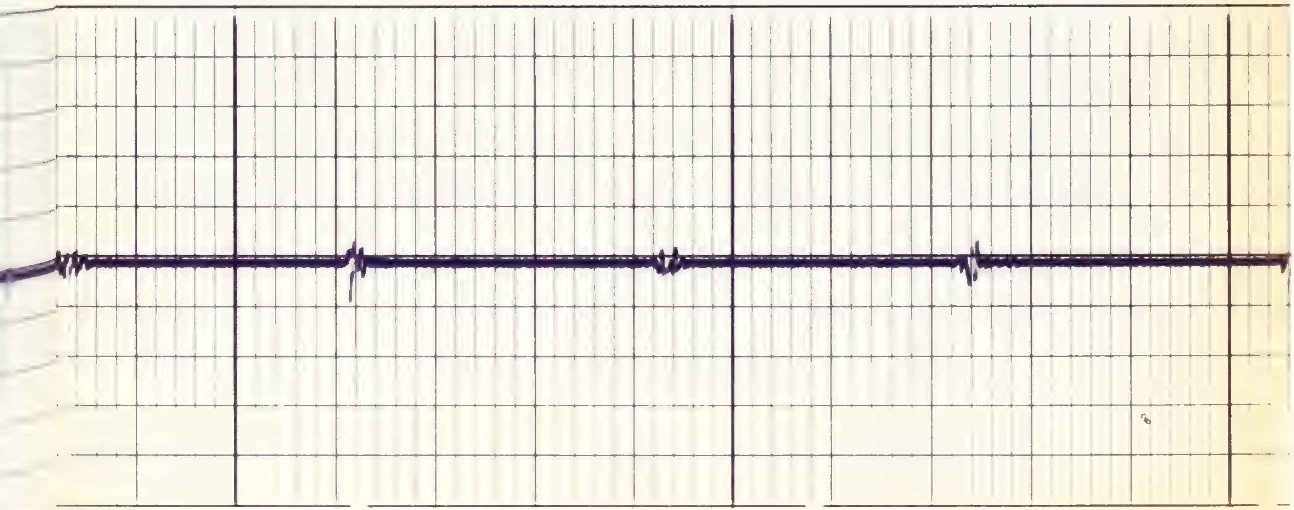

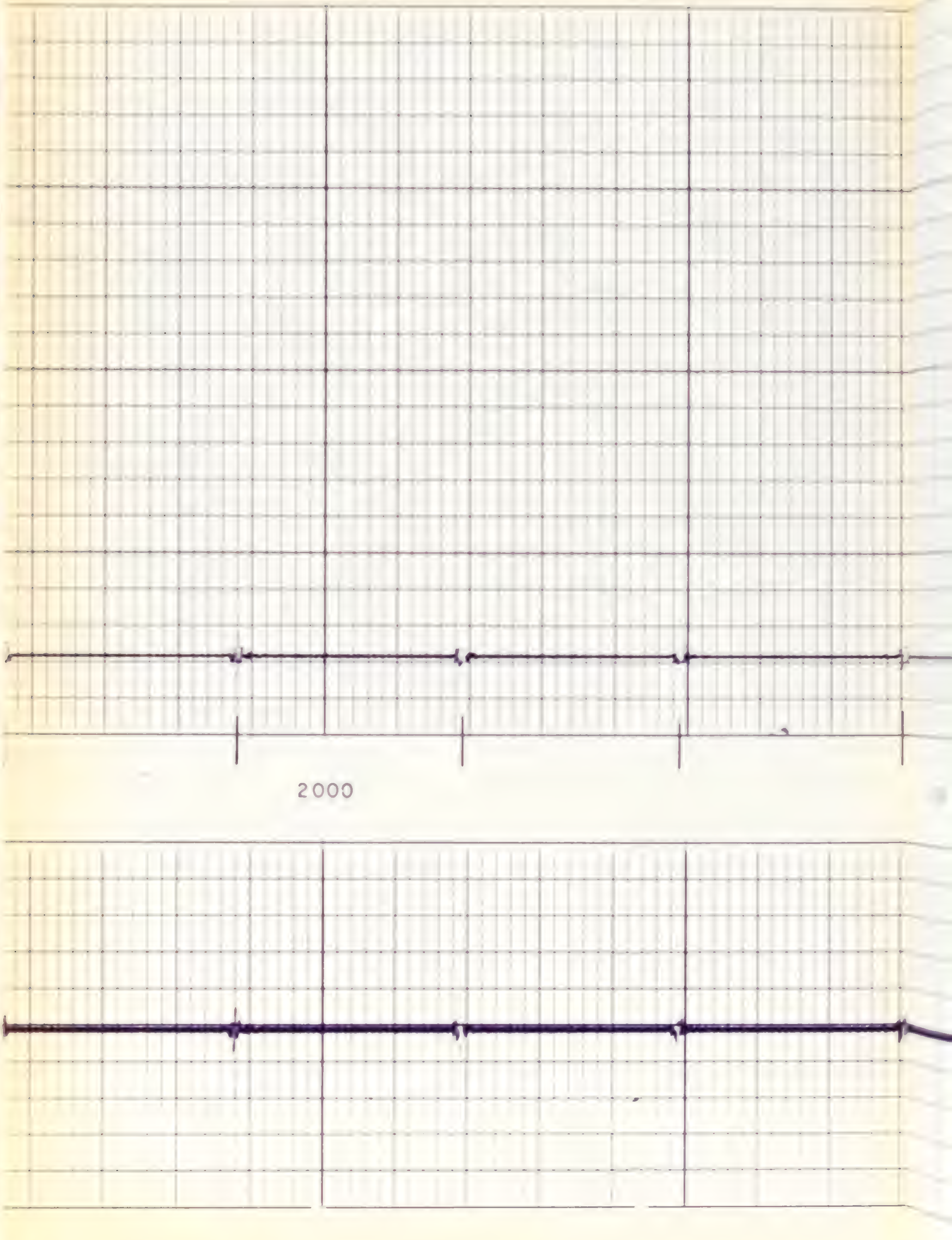
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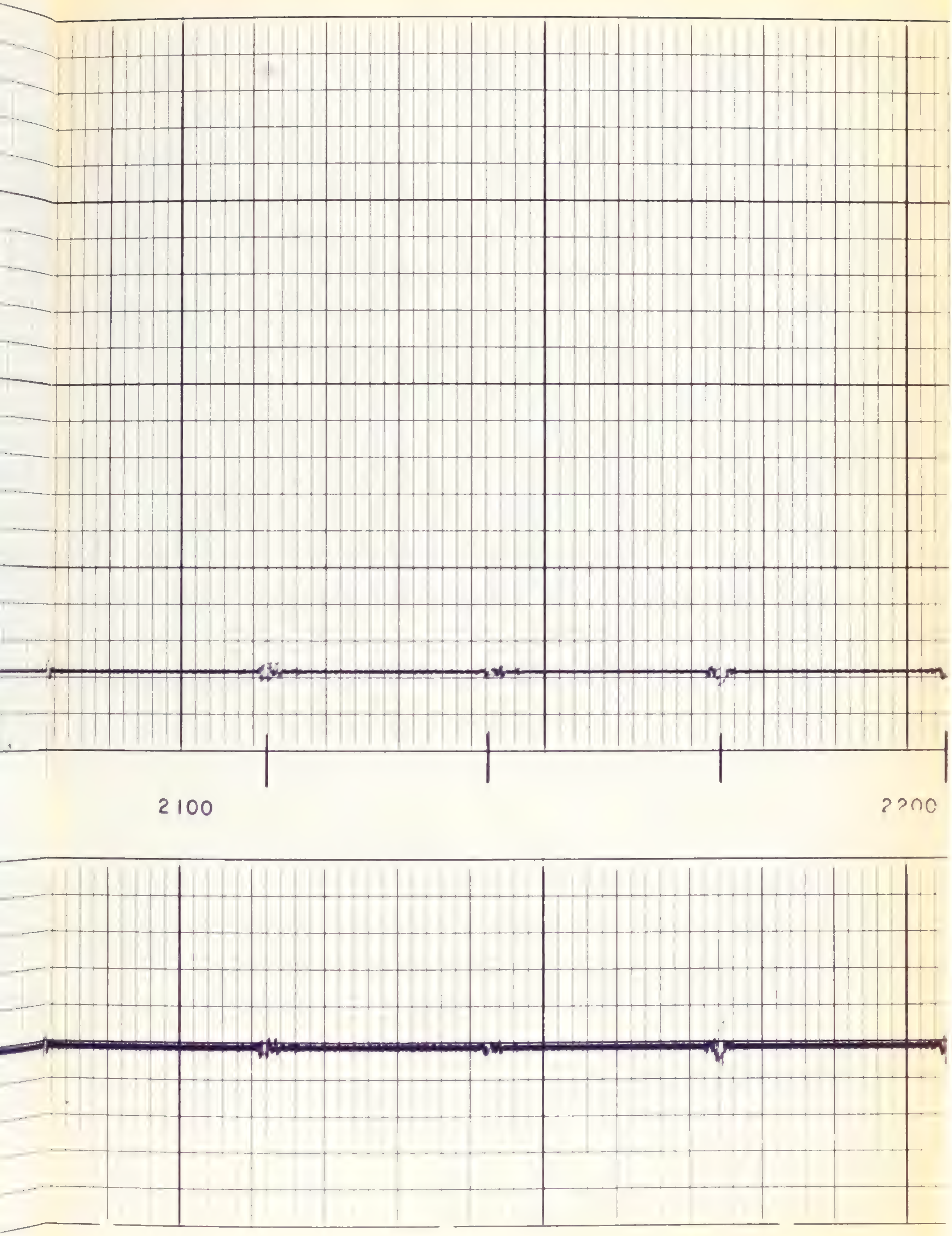
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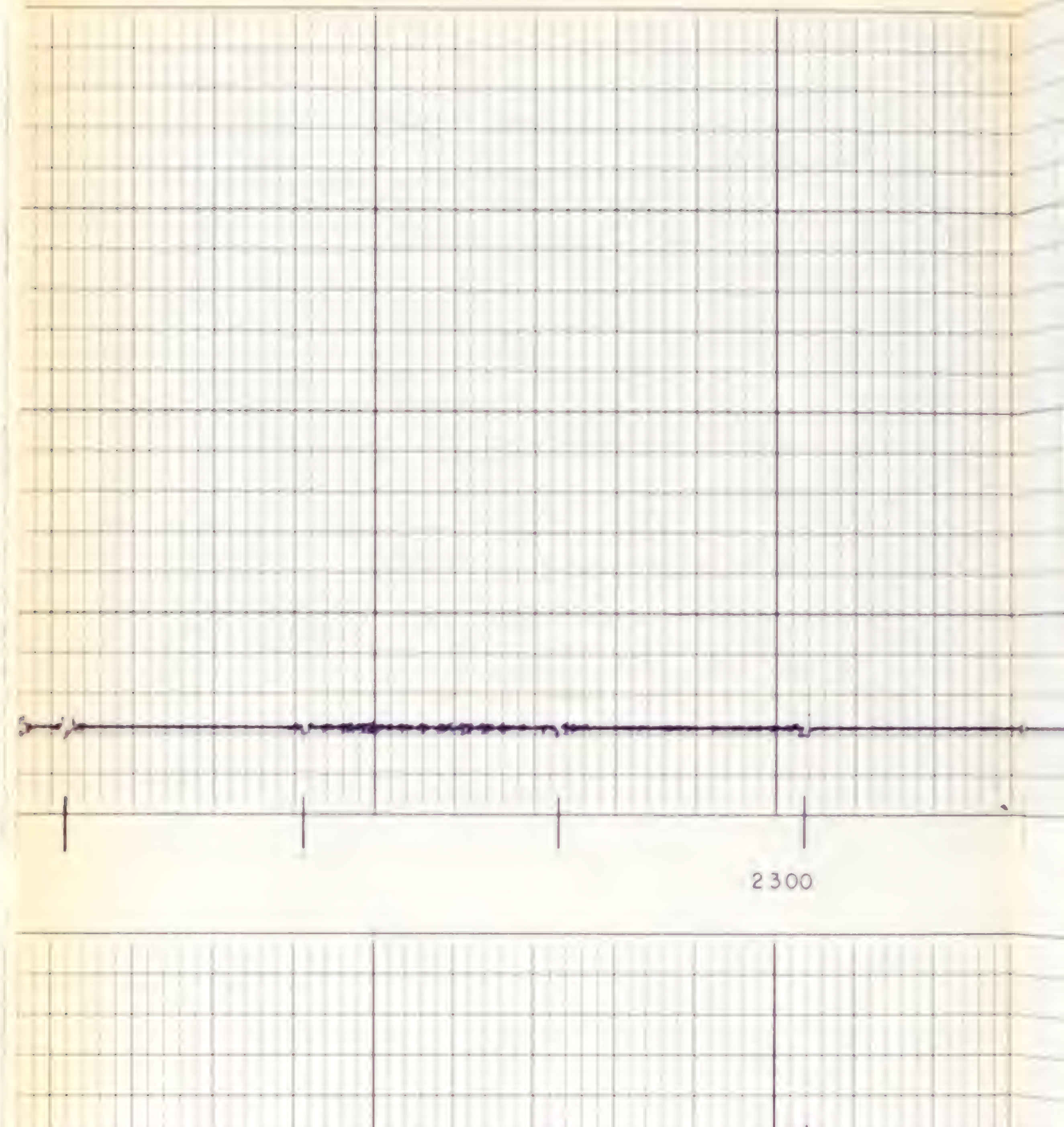
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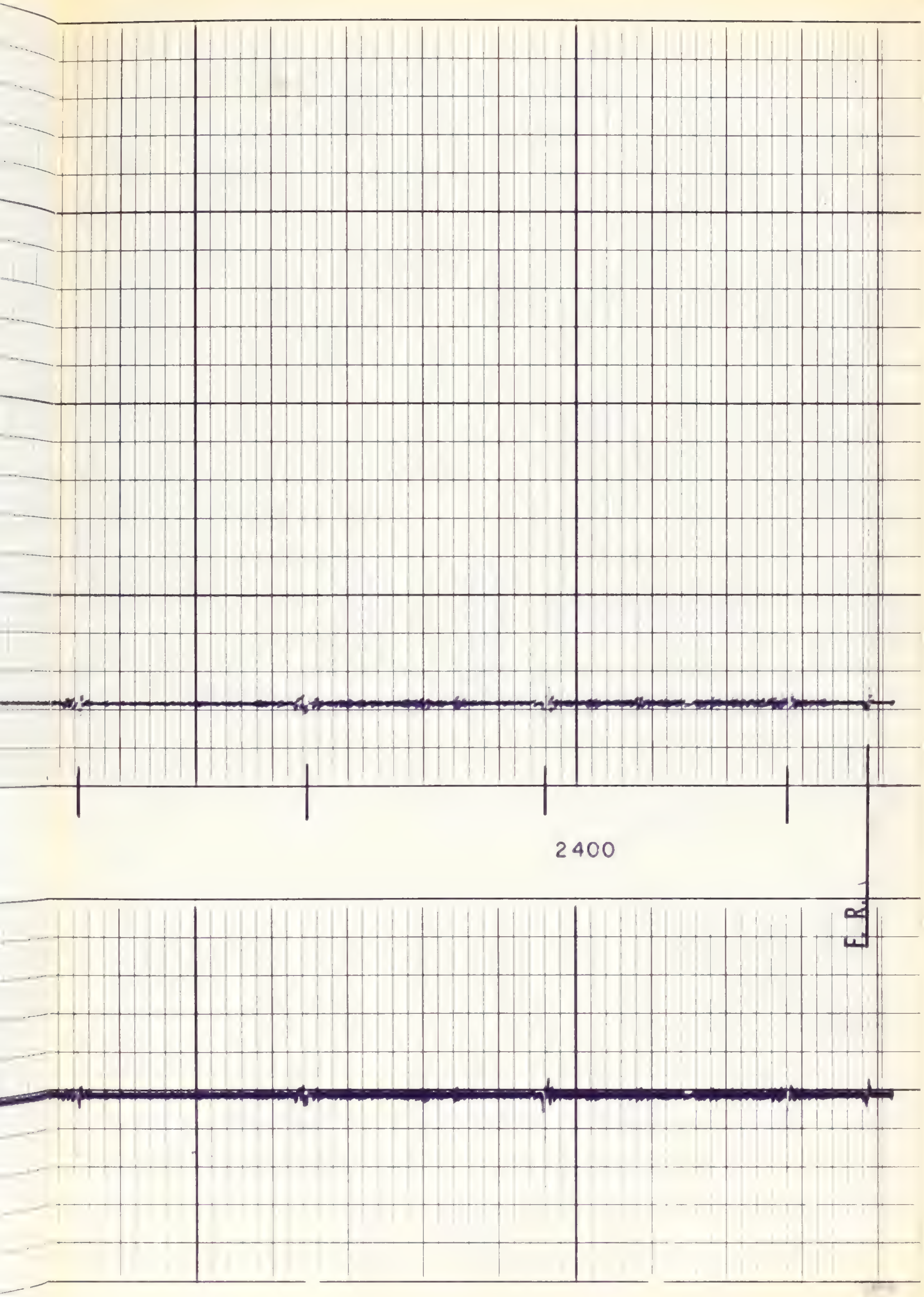
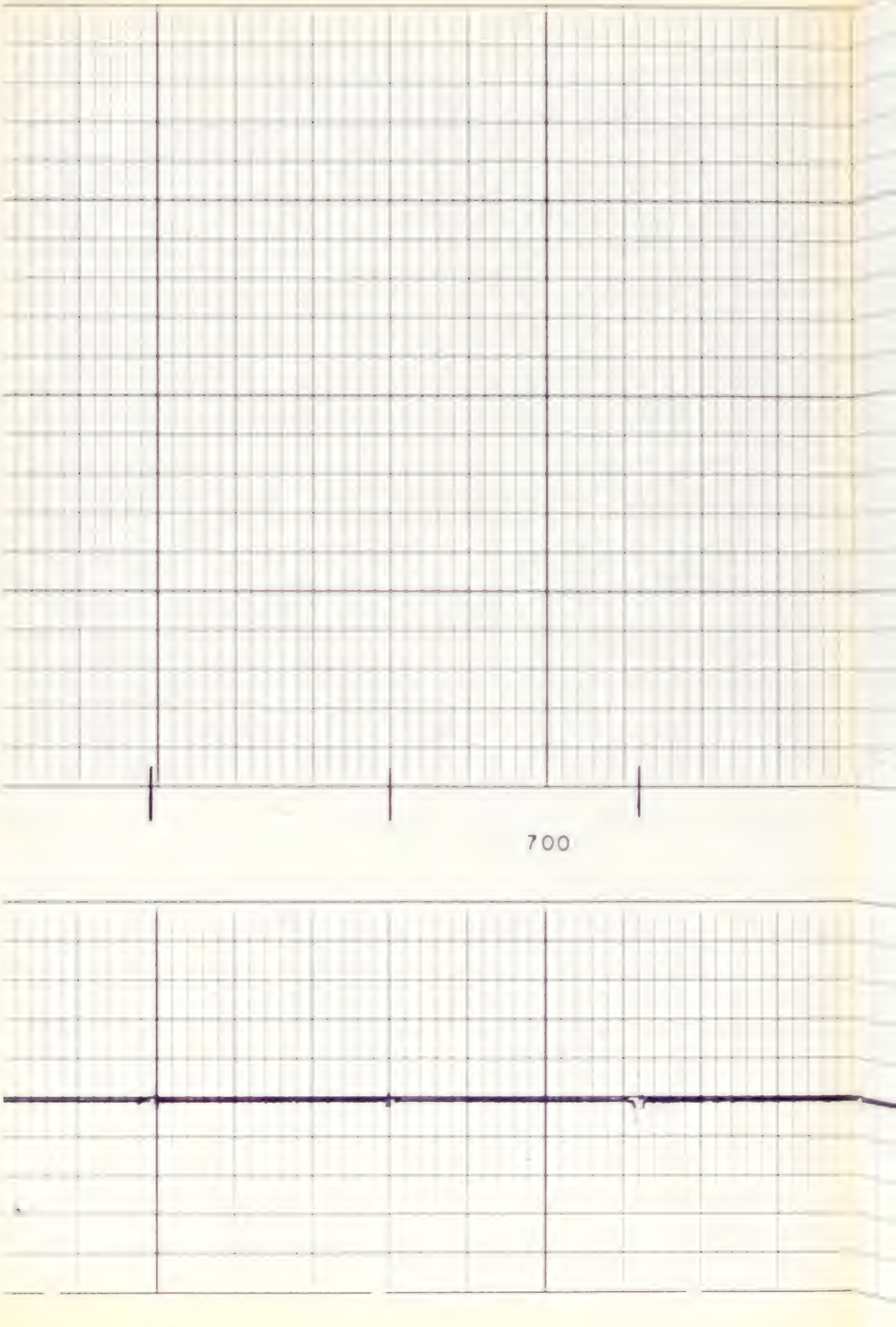

2400
E.R.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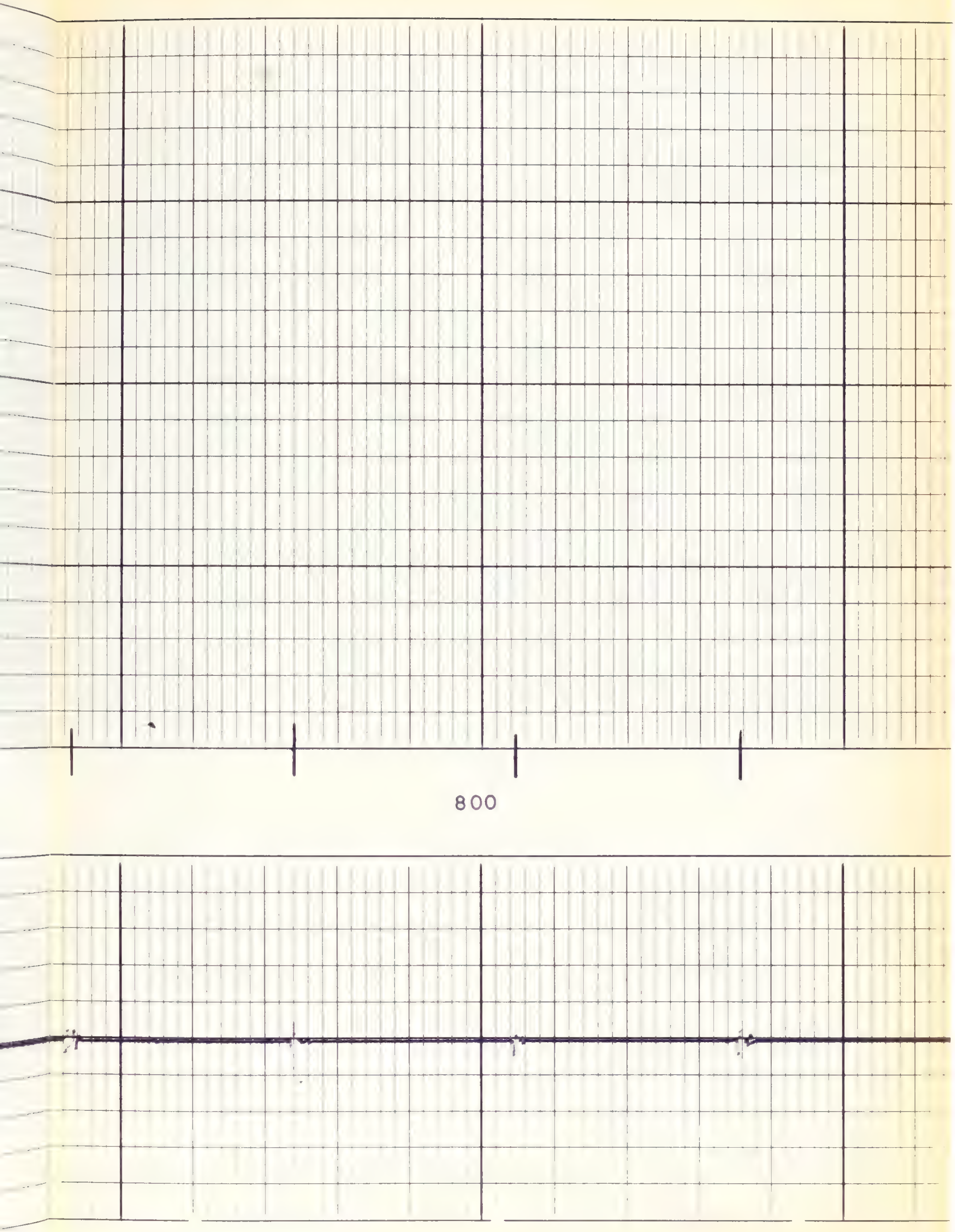
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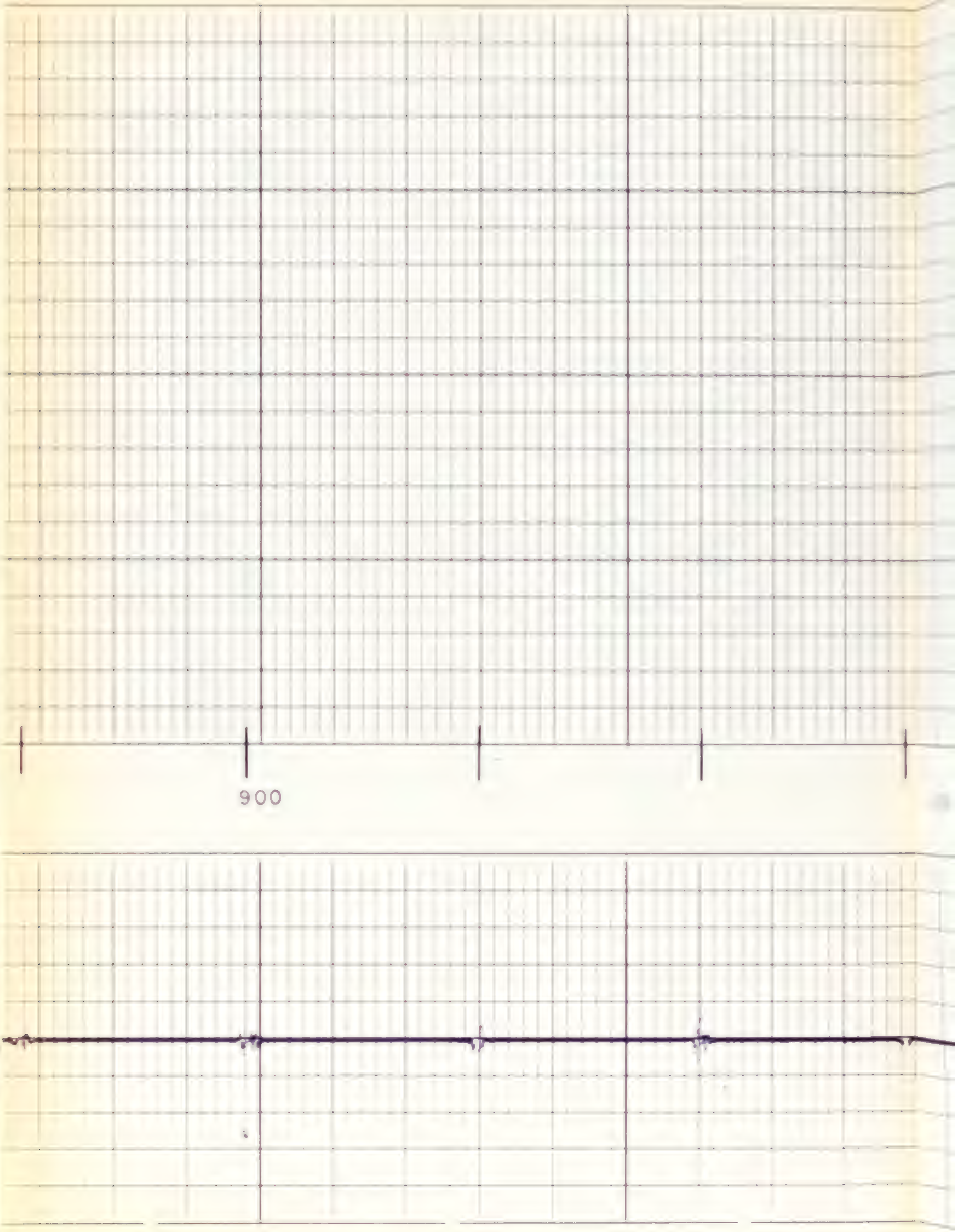
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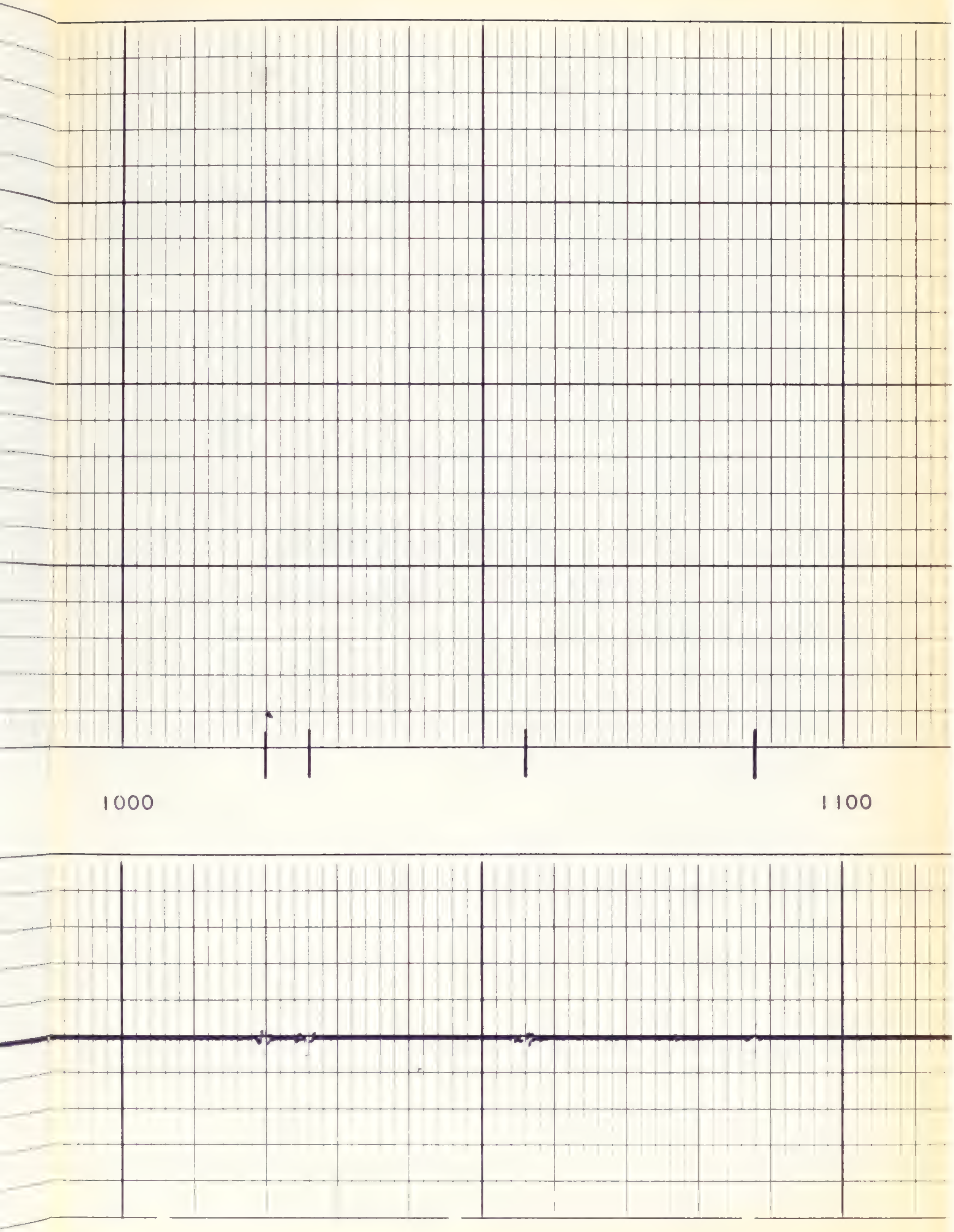
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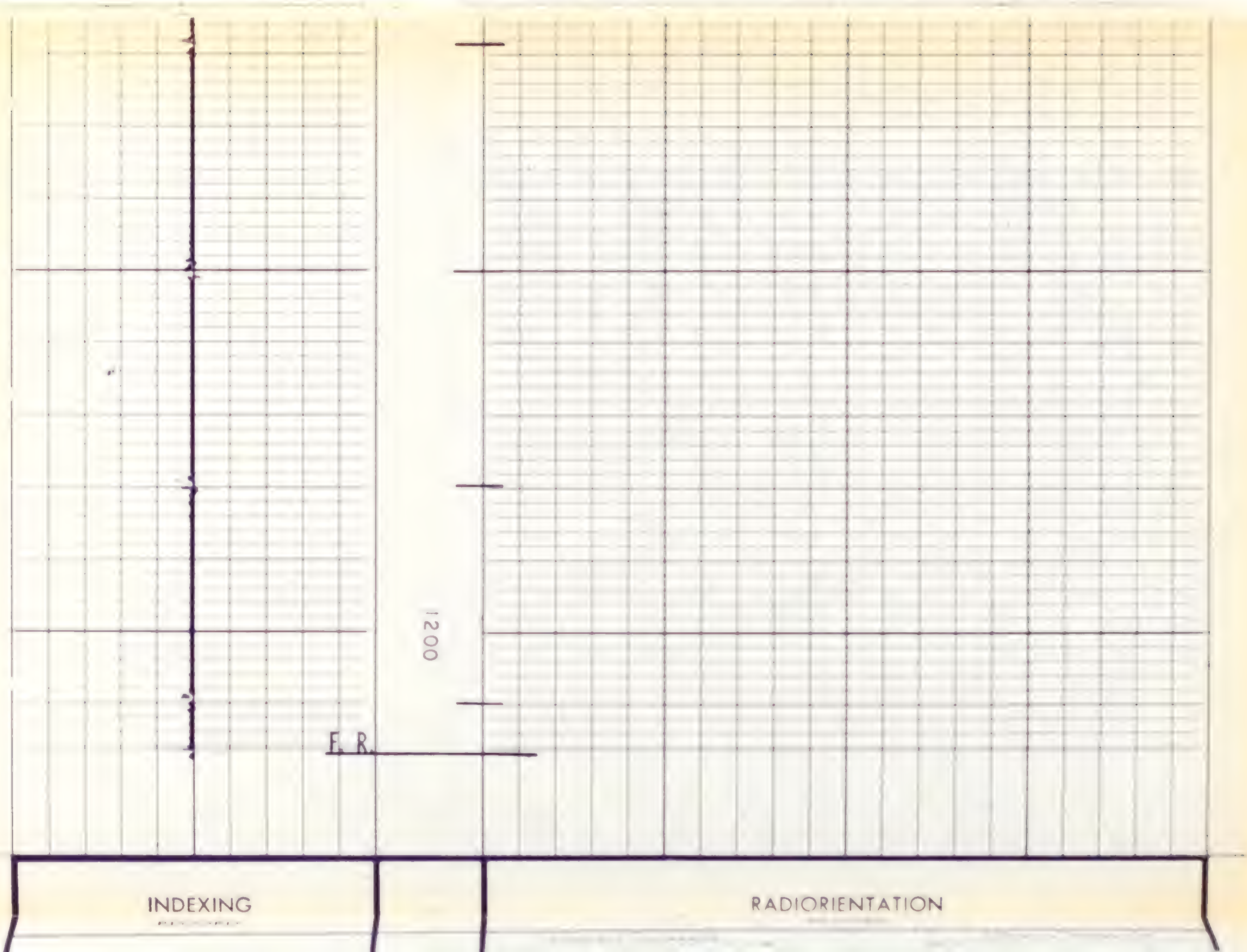
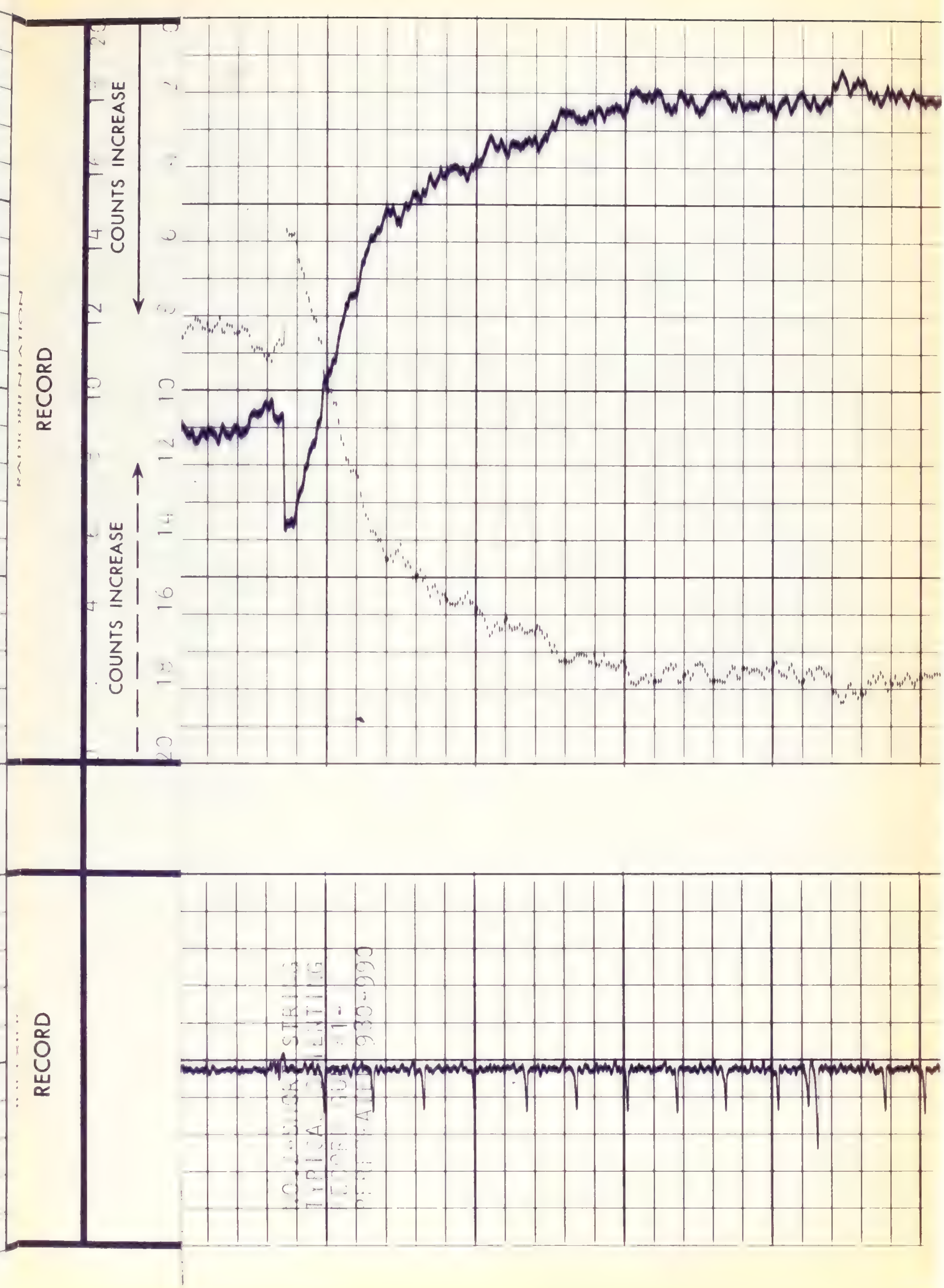
1100


1200
E. R.
INDEXING
RADIORIENTATION


RADIOACTIVATION
RECORD
COUNTS INCREASE
COUNTS INCREASE
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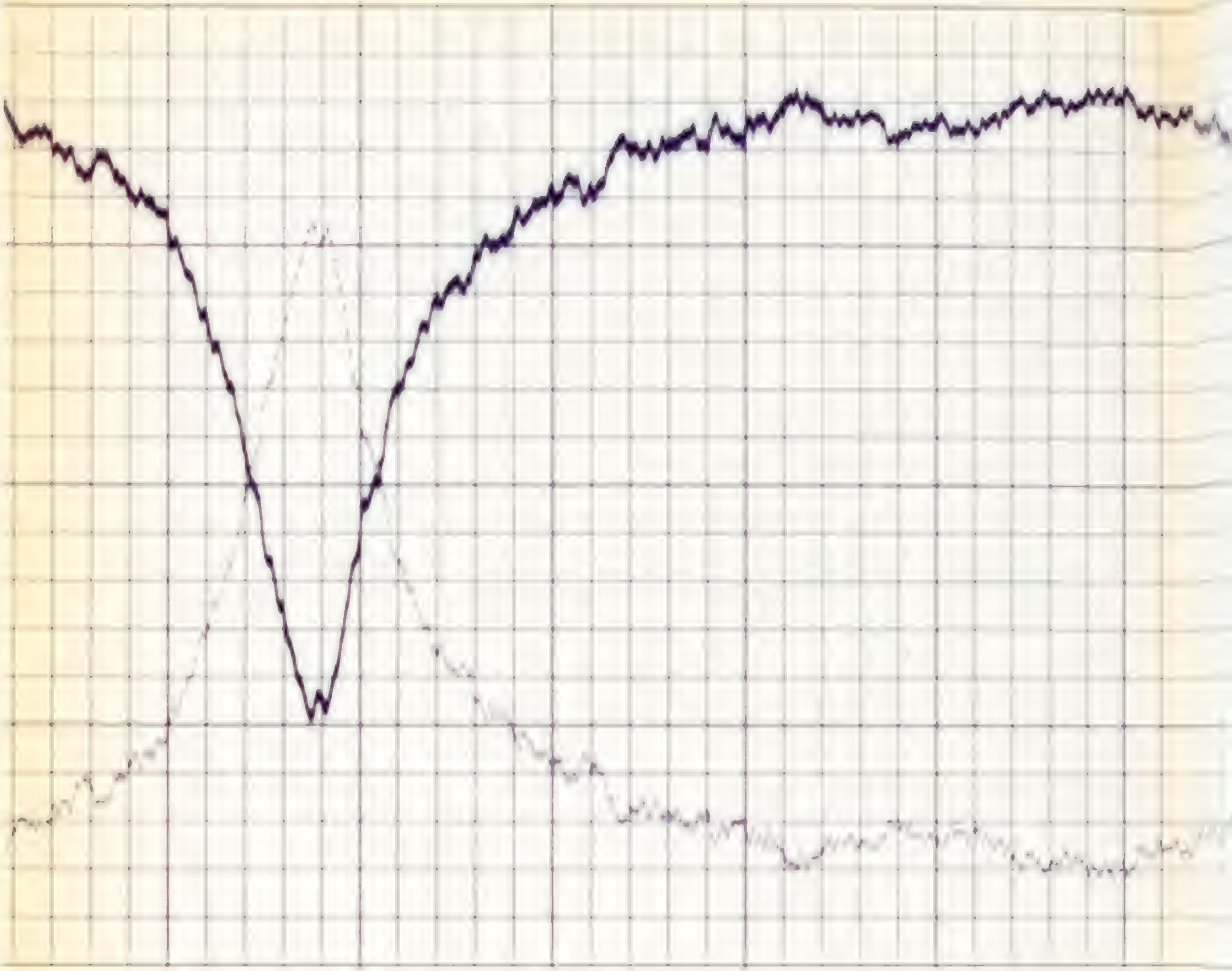
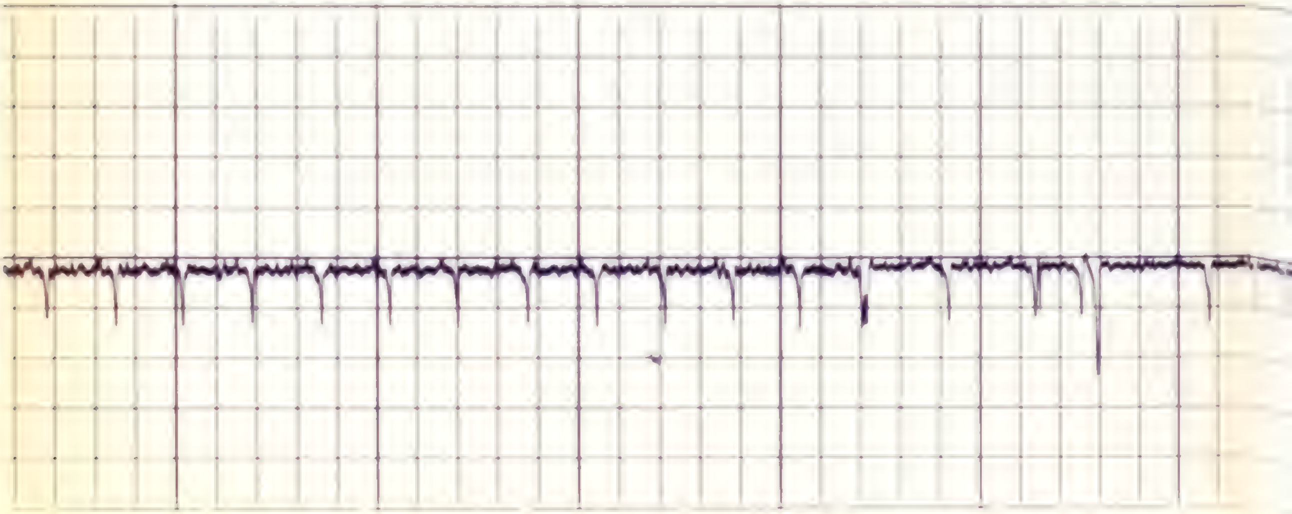
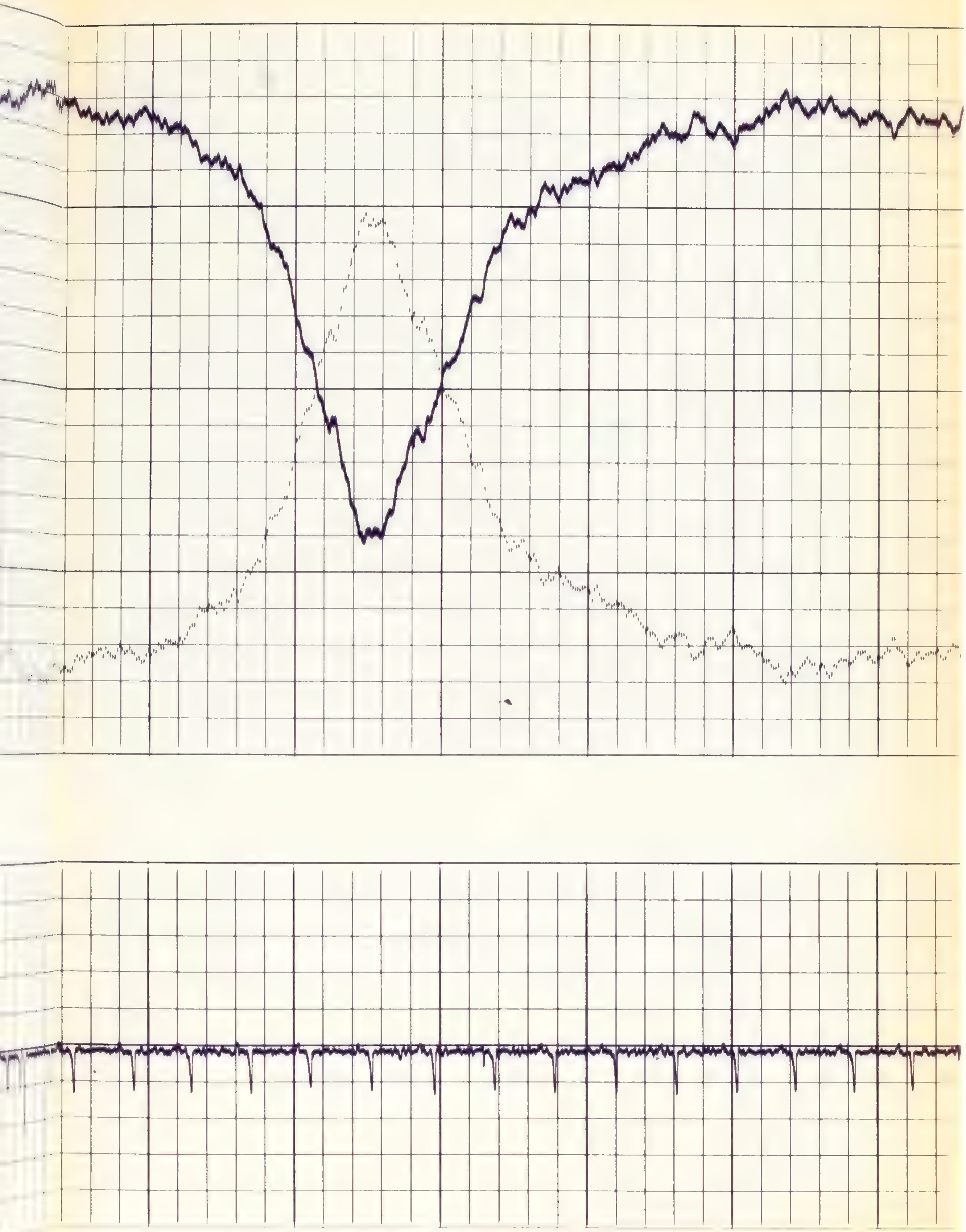
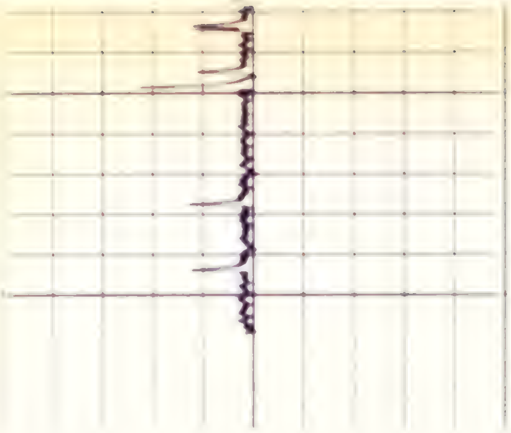
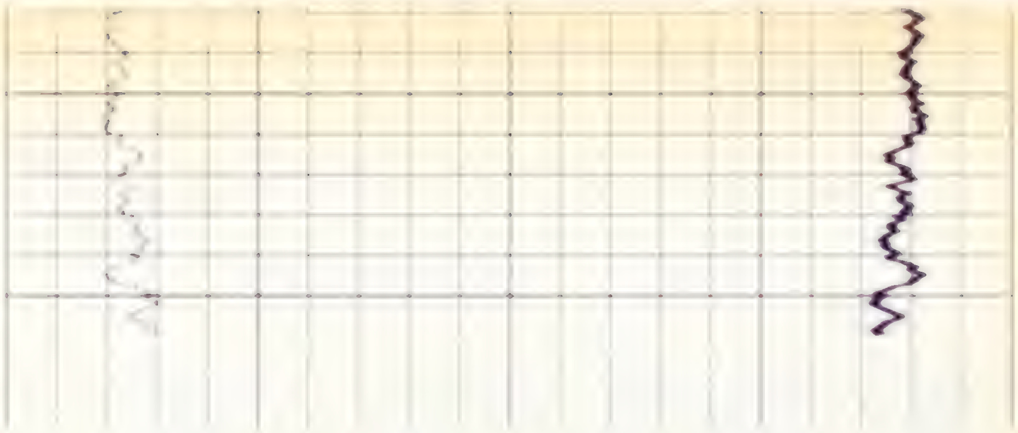
18
16
14
12
10
8
6
4
2
0
RECORD
TYPICAL
9380-990







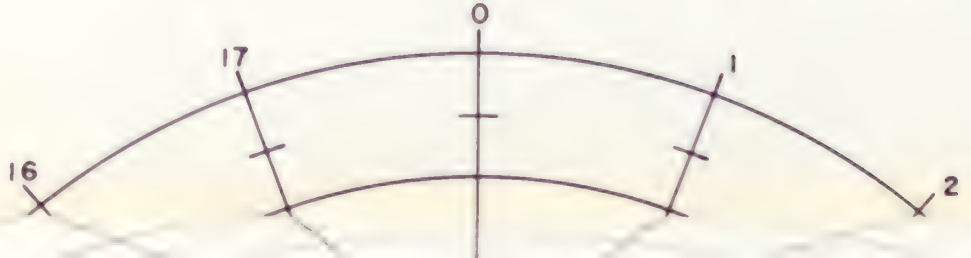


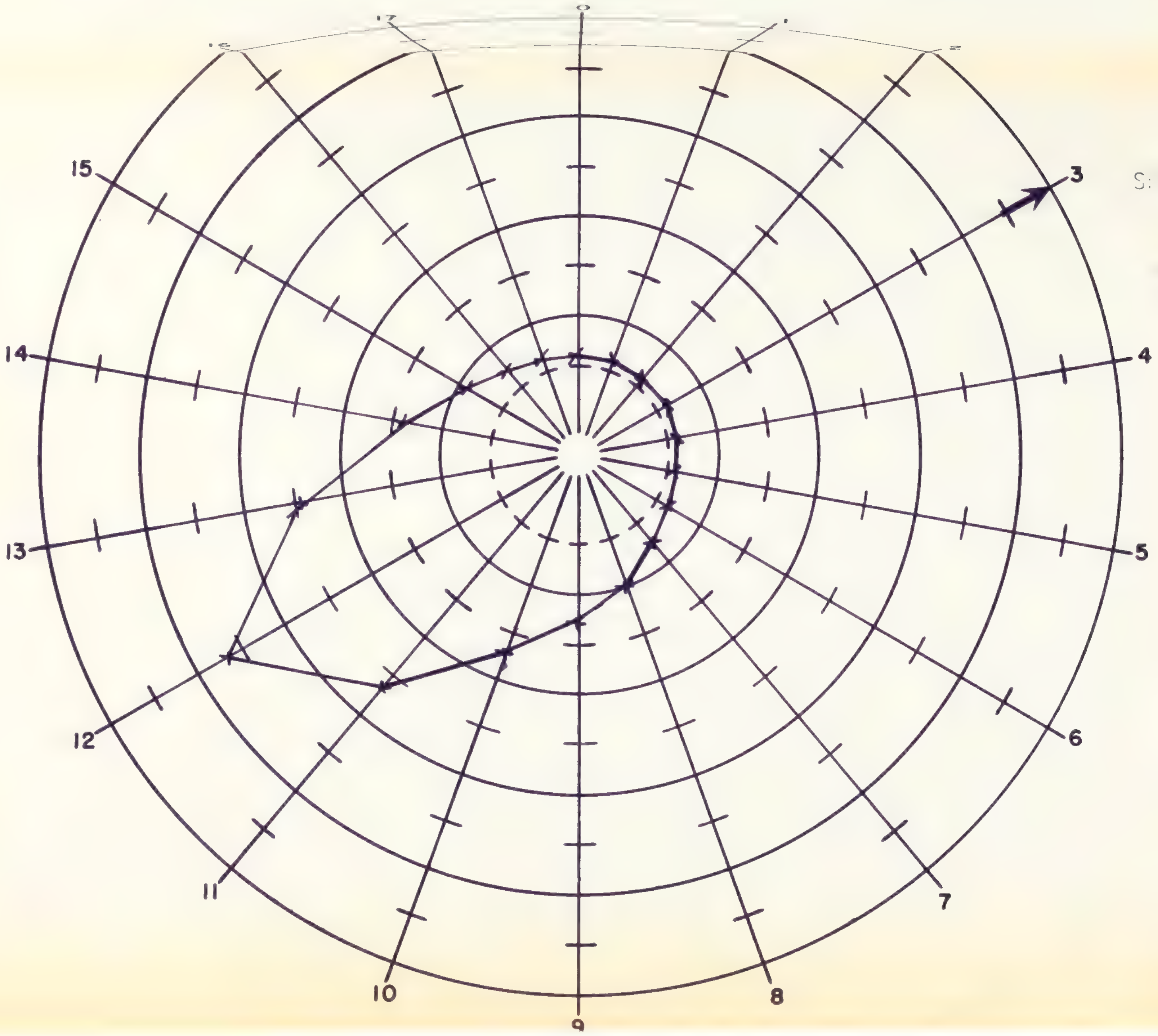


RADIORIENTATION PLOT

POT-B

[illegible]




16
17
0
1
2
3
4
5
6
7
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9
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11
12
13
14
15

This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by magnetic metal in the drill hole and other conditions unknown to us.

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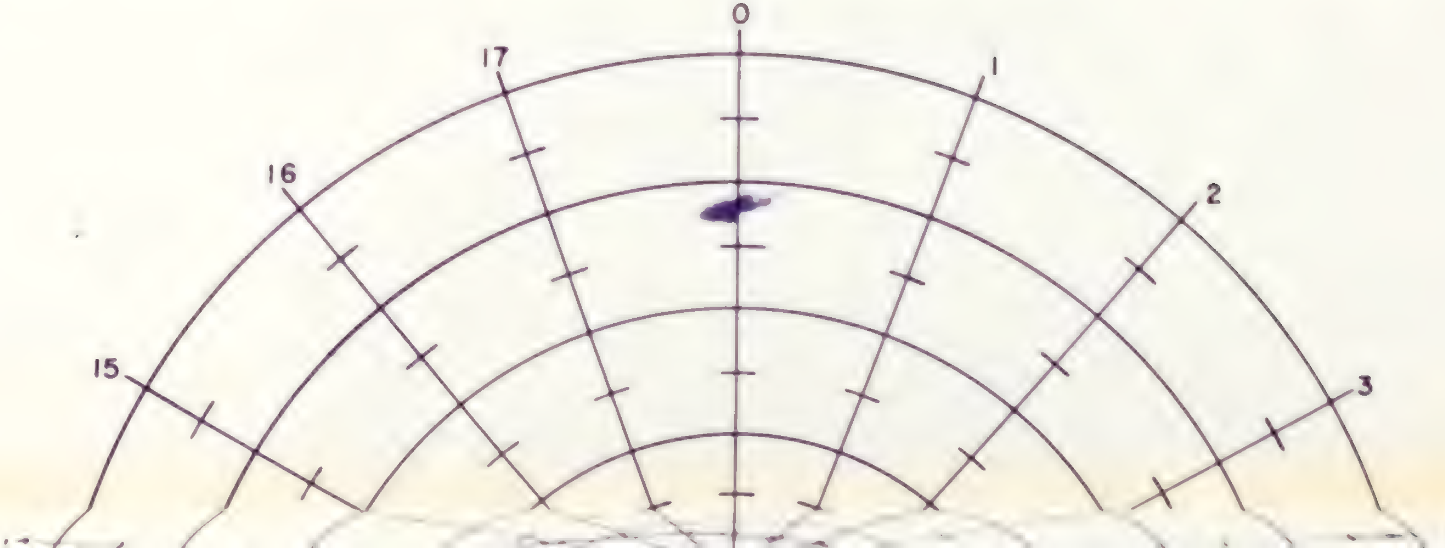
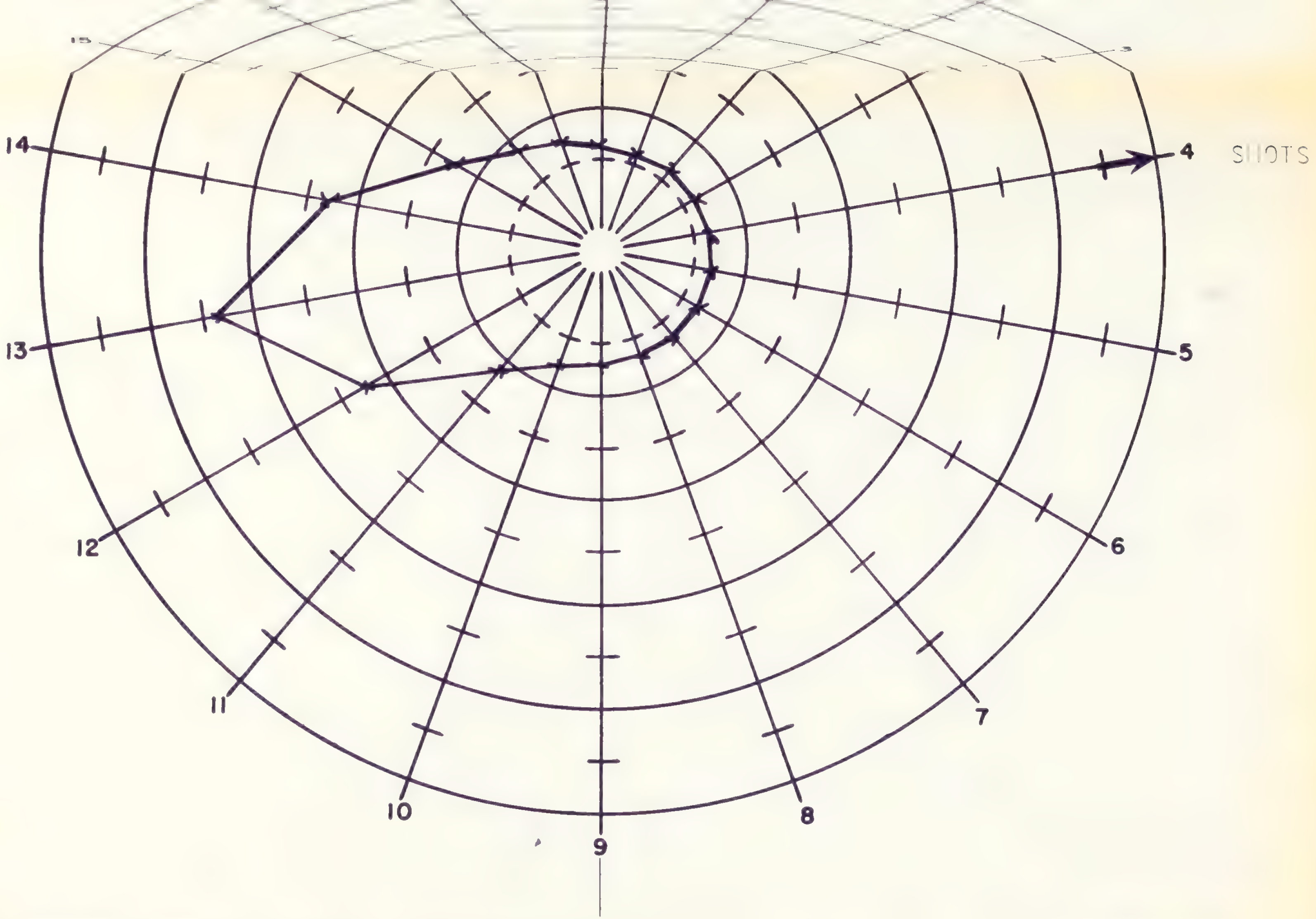
RADIORIENTATION PLOT

POT-B

[illegible]



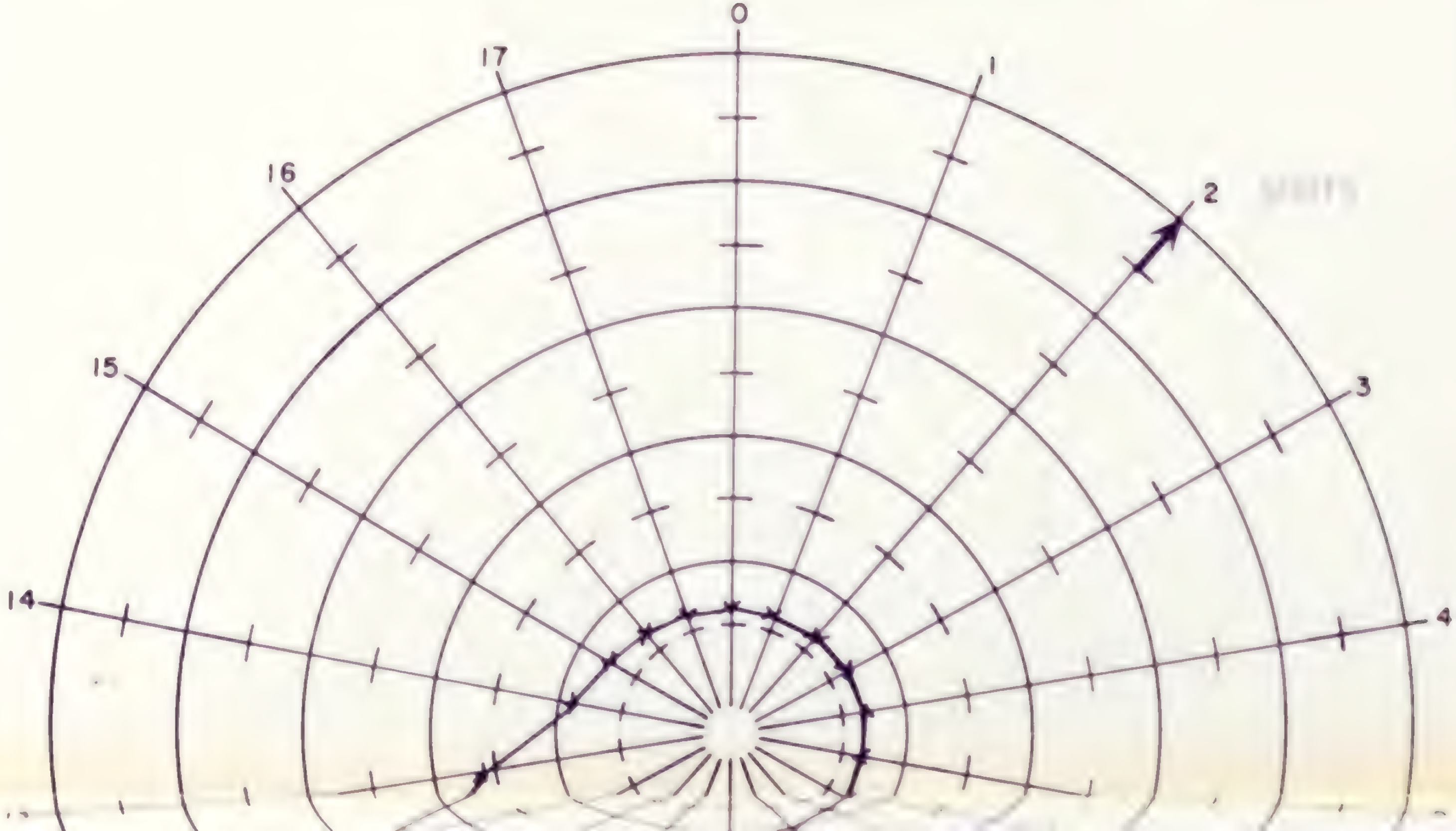


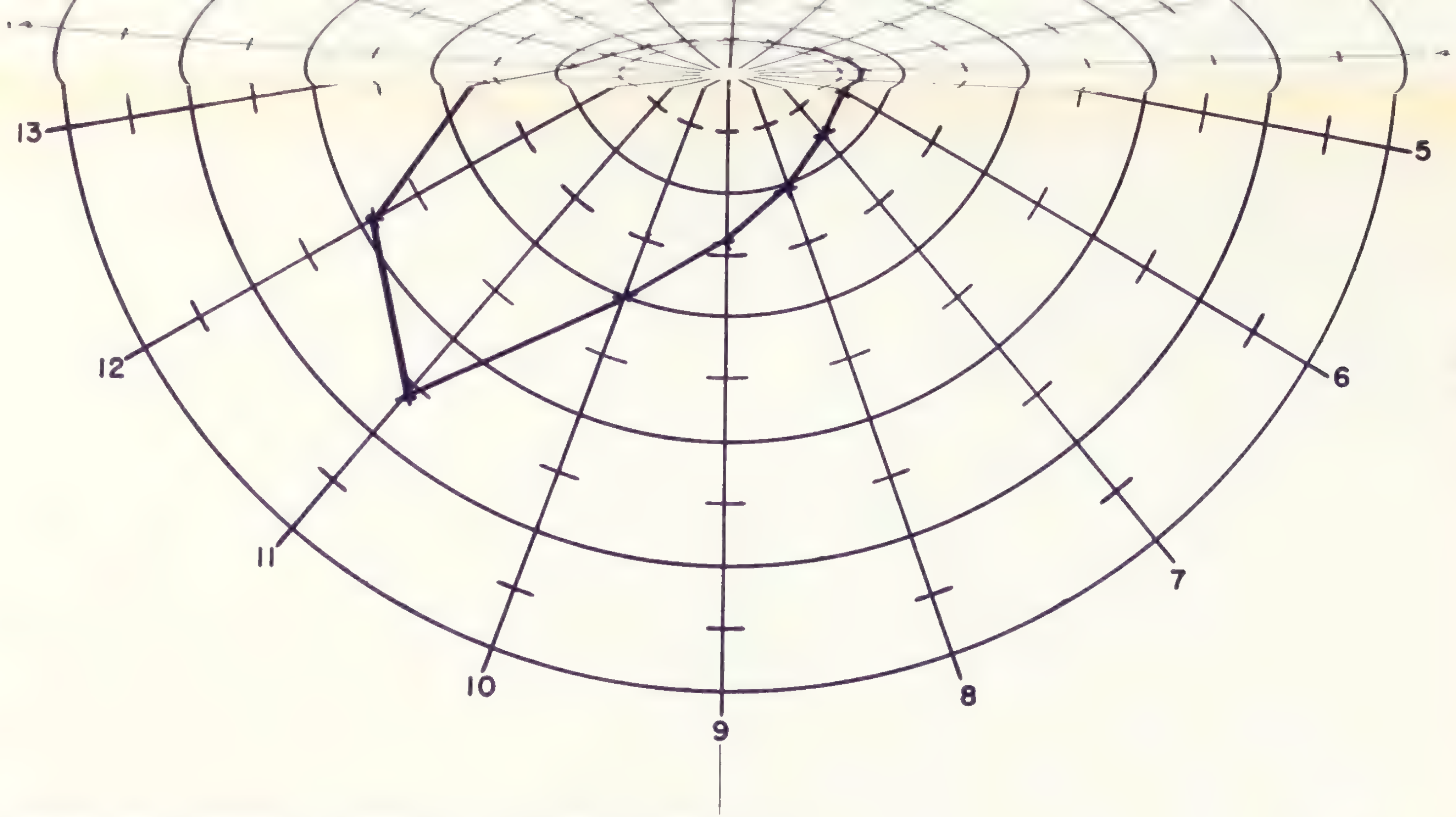
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B



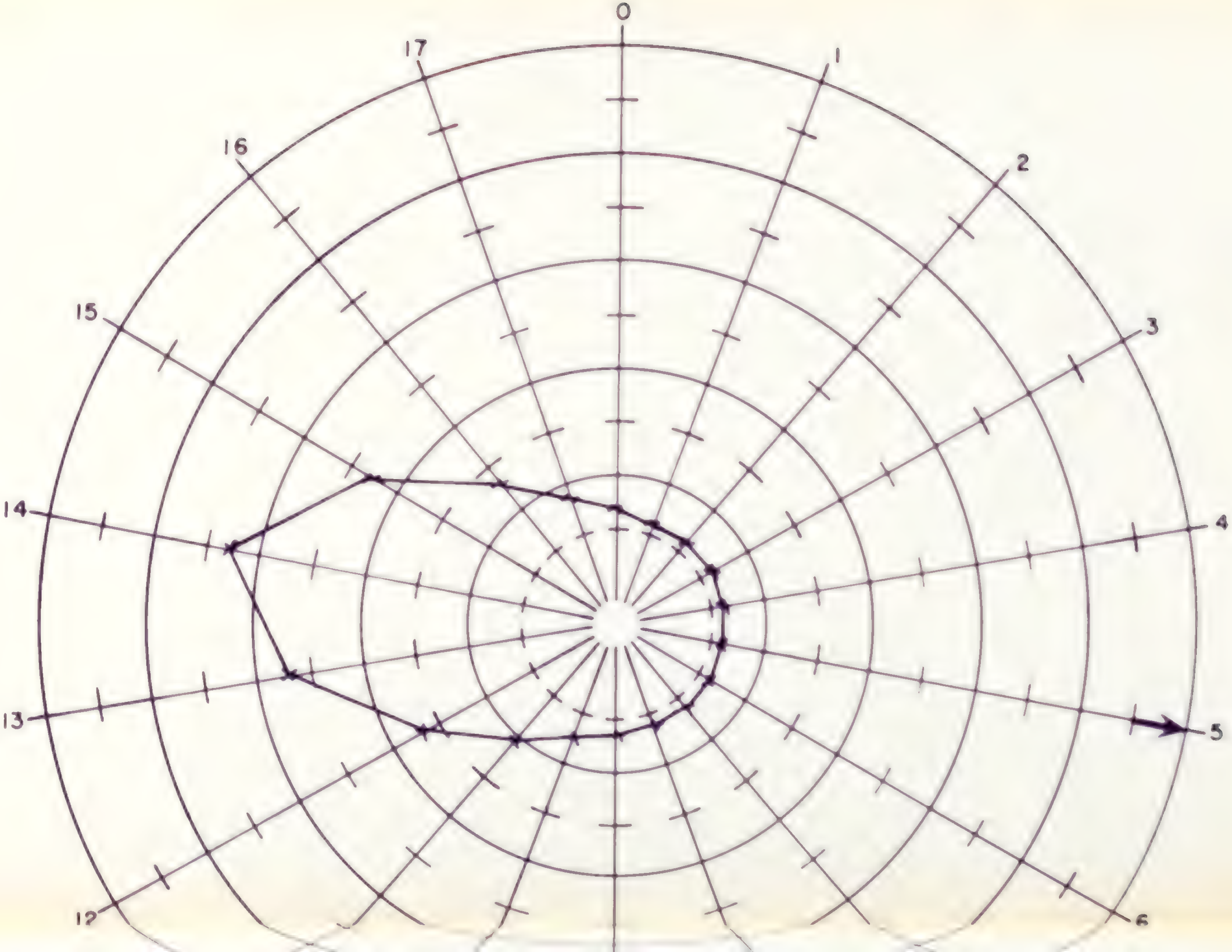


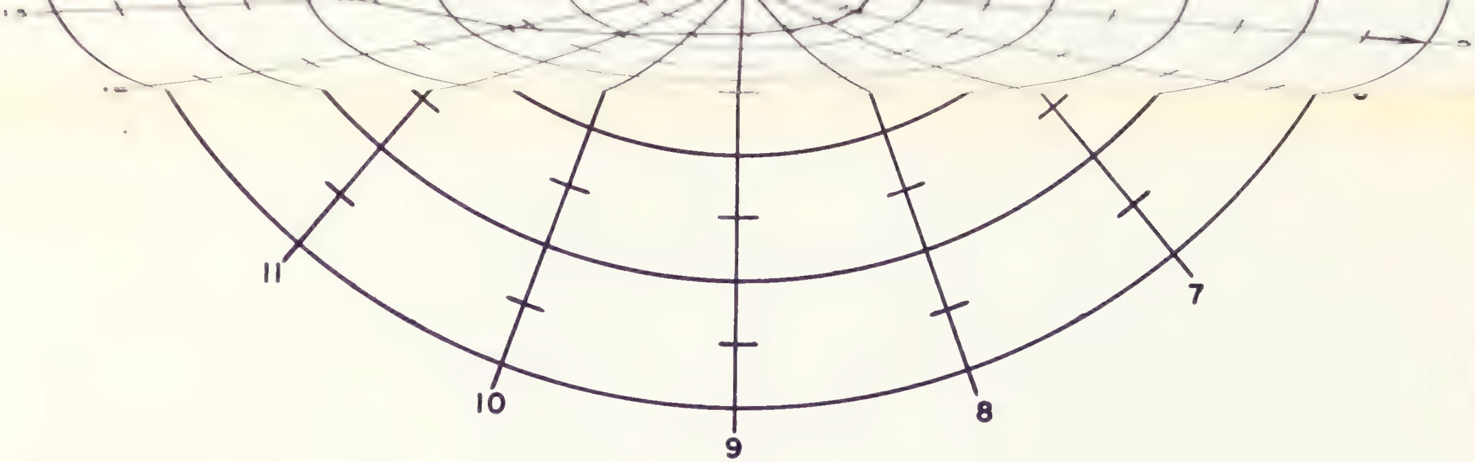
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B





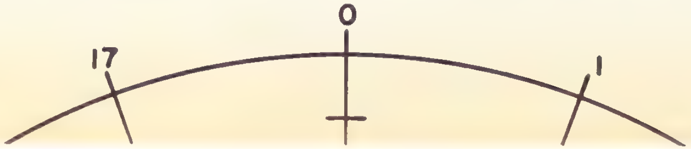
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

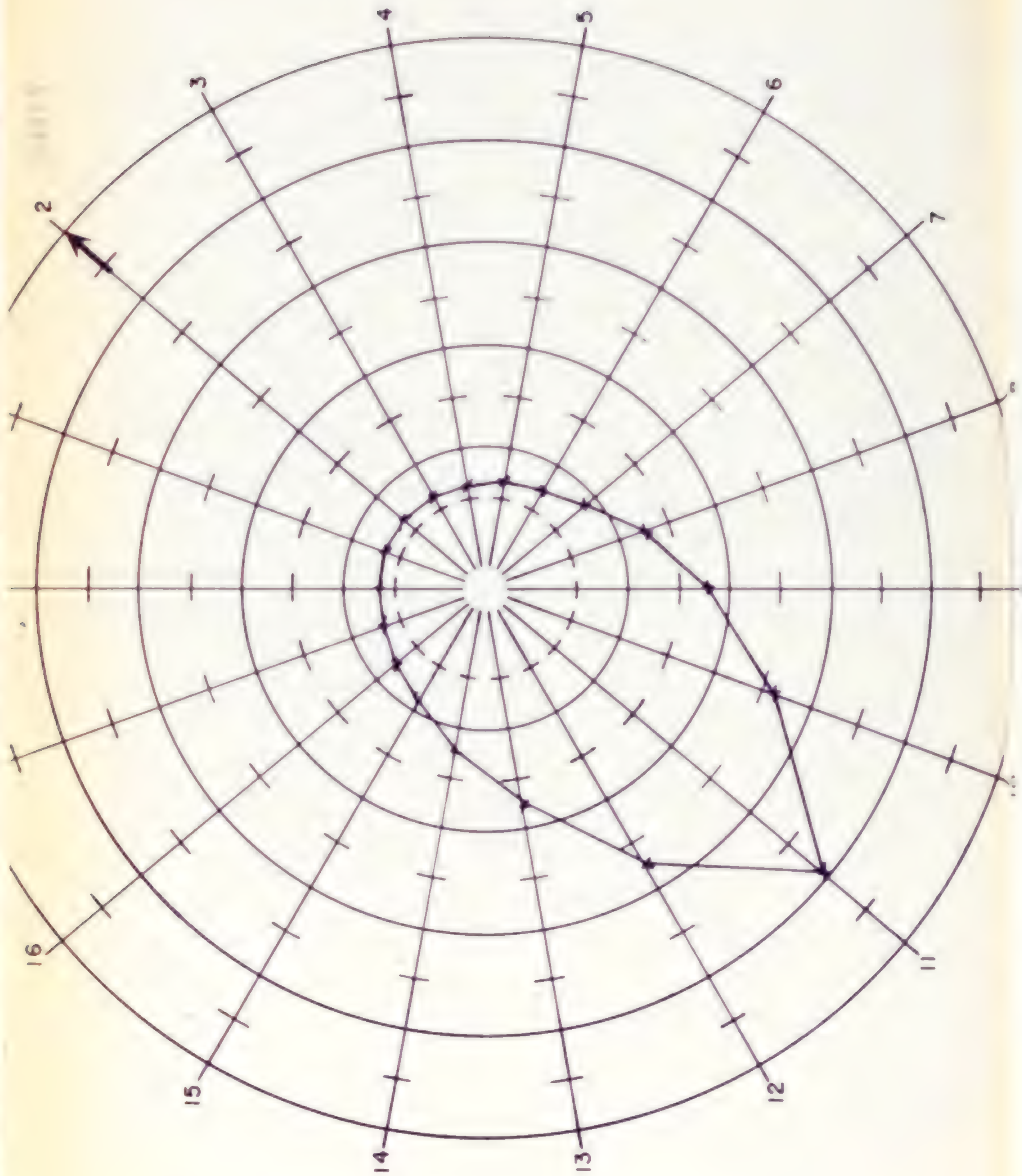
Schlumberger

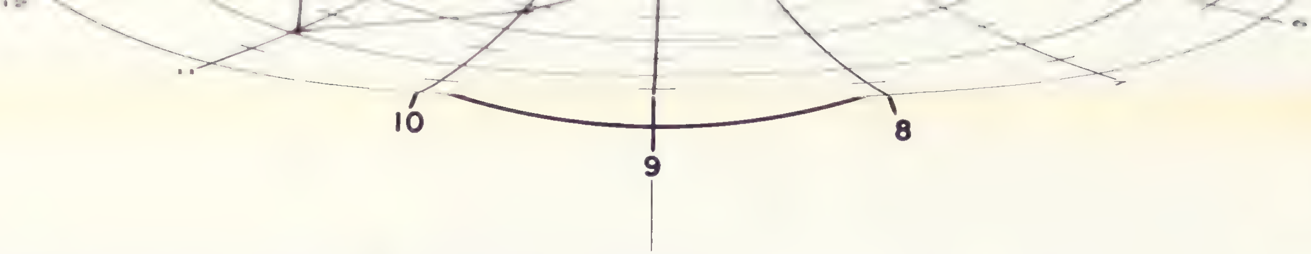
RADIORIENTATION PLOT

POT-B

.2-SHORT STRING-PERFORATED 325-335 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




2
3
4
5
6
7
11
12
13
14
15
16



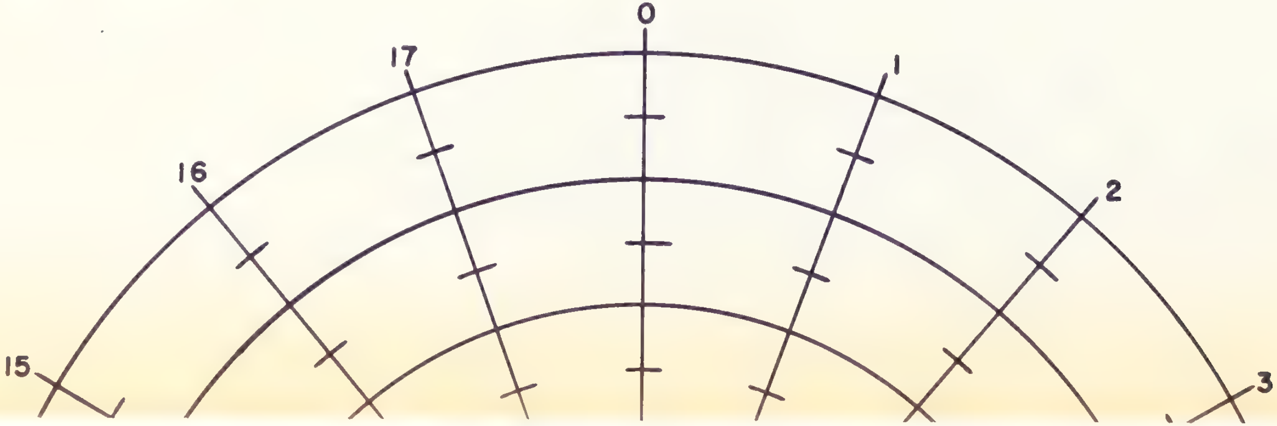
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

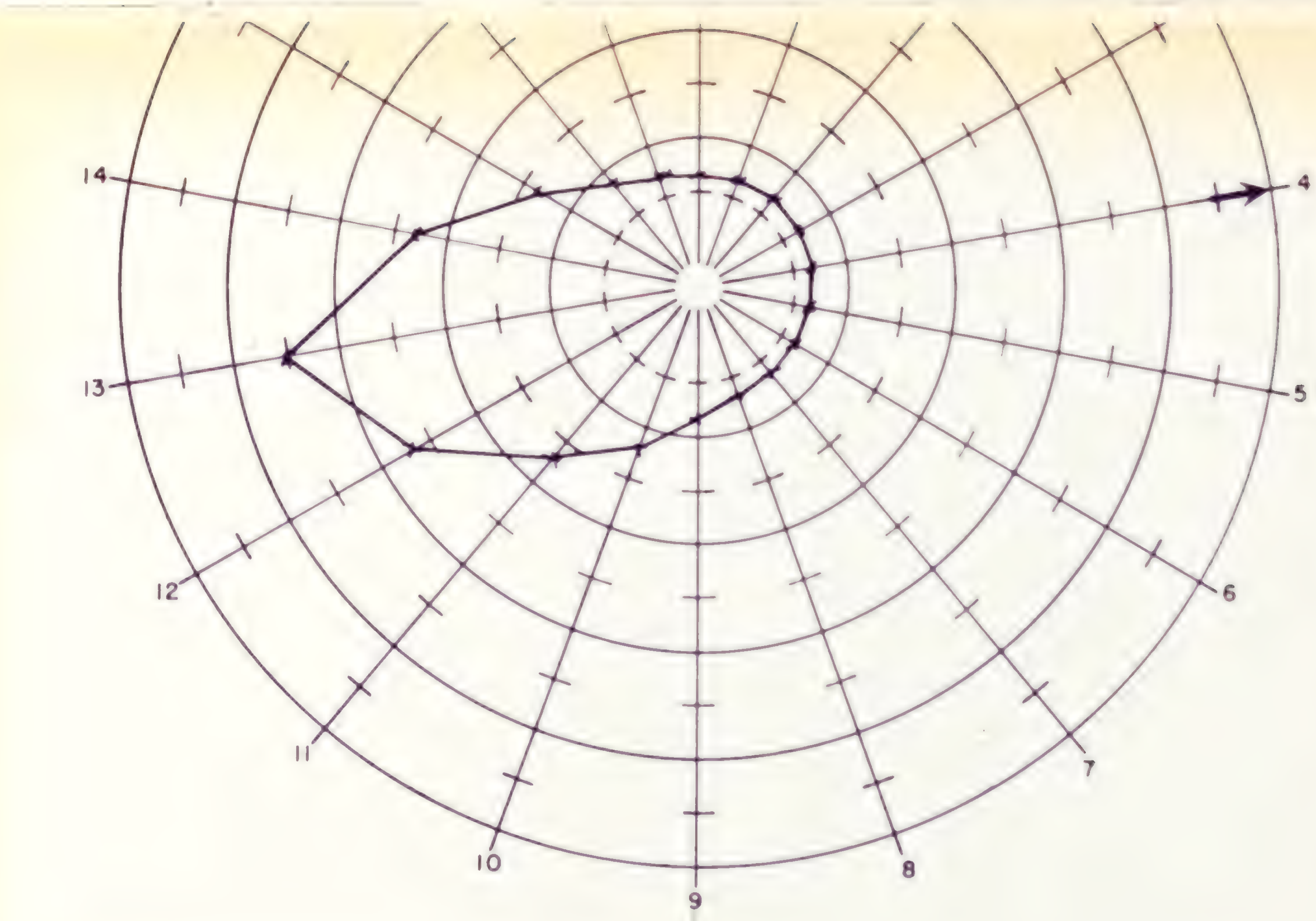
Schlumberger

RADIORIENTATION PLOT

POT-B

[illegible] RT STRING PERFORATED 014-9.4 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





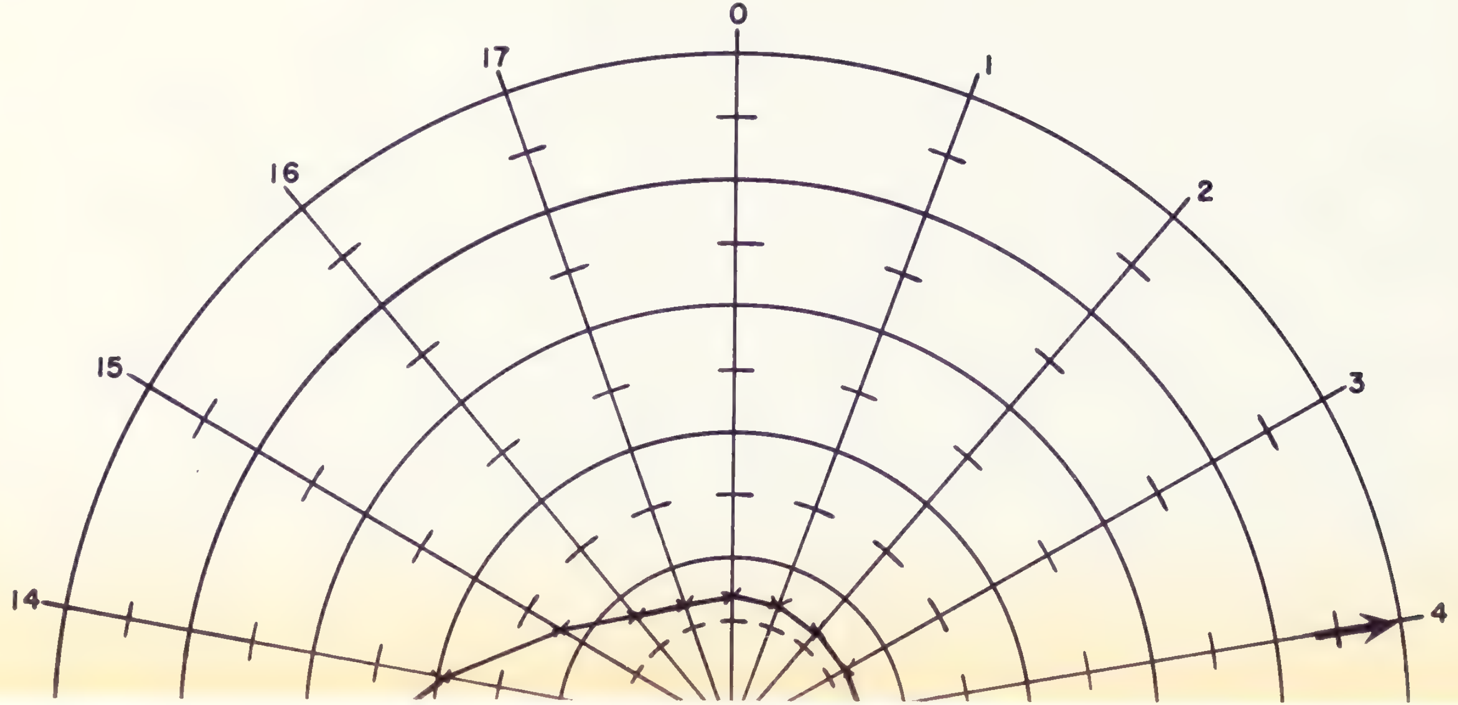
This chart, computation and/or interpretation of our readings from our [illegible] hole testing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are [illegible] on the reverse side of our Service Order for this job. The readings could be adversely affected by [illegible] metal in the drill hole and other conditions unknown to us.

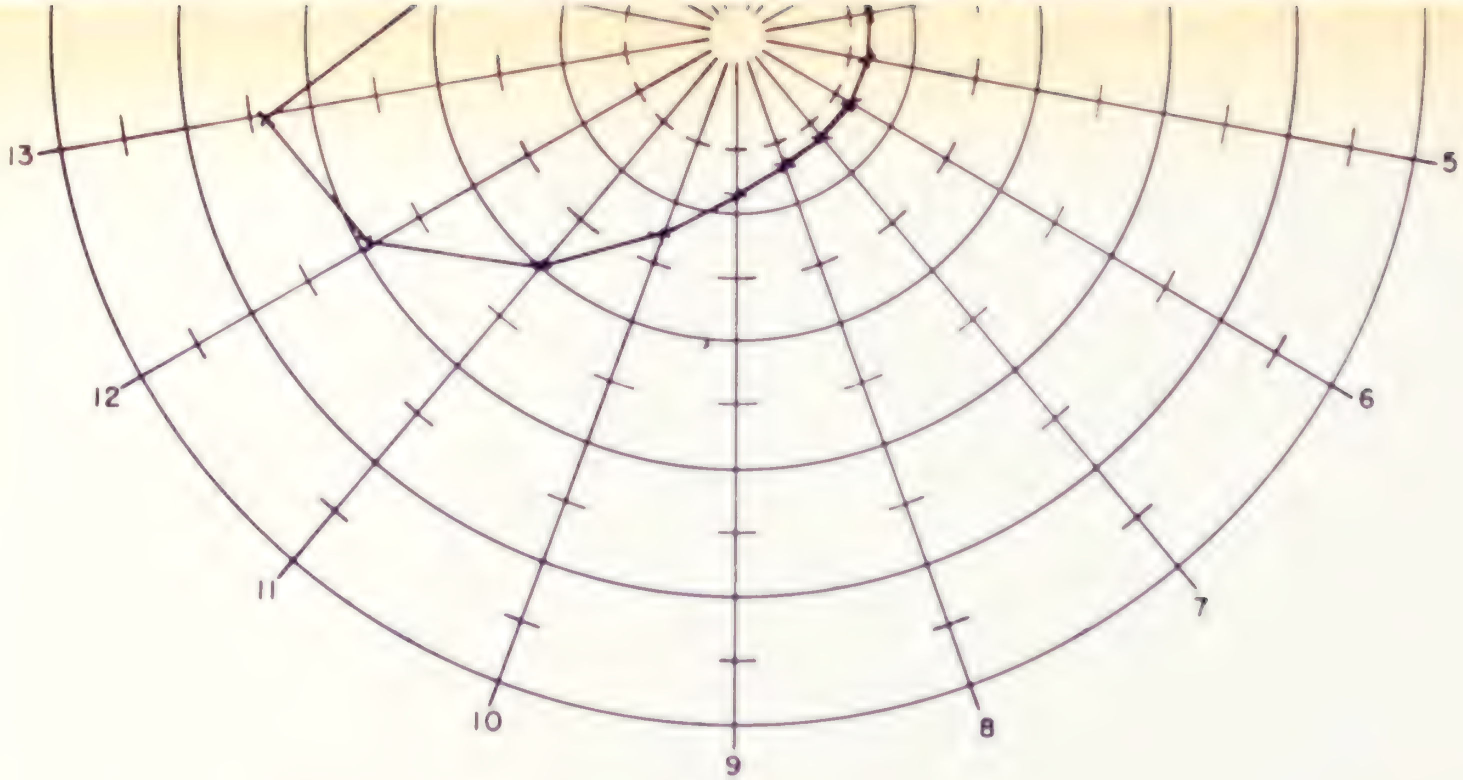
Schlumberger

RADIORIENTATION PLOT

POT-B

SHORT STRING-PERFORATED [illegible] ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





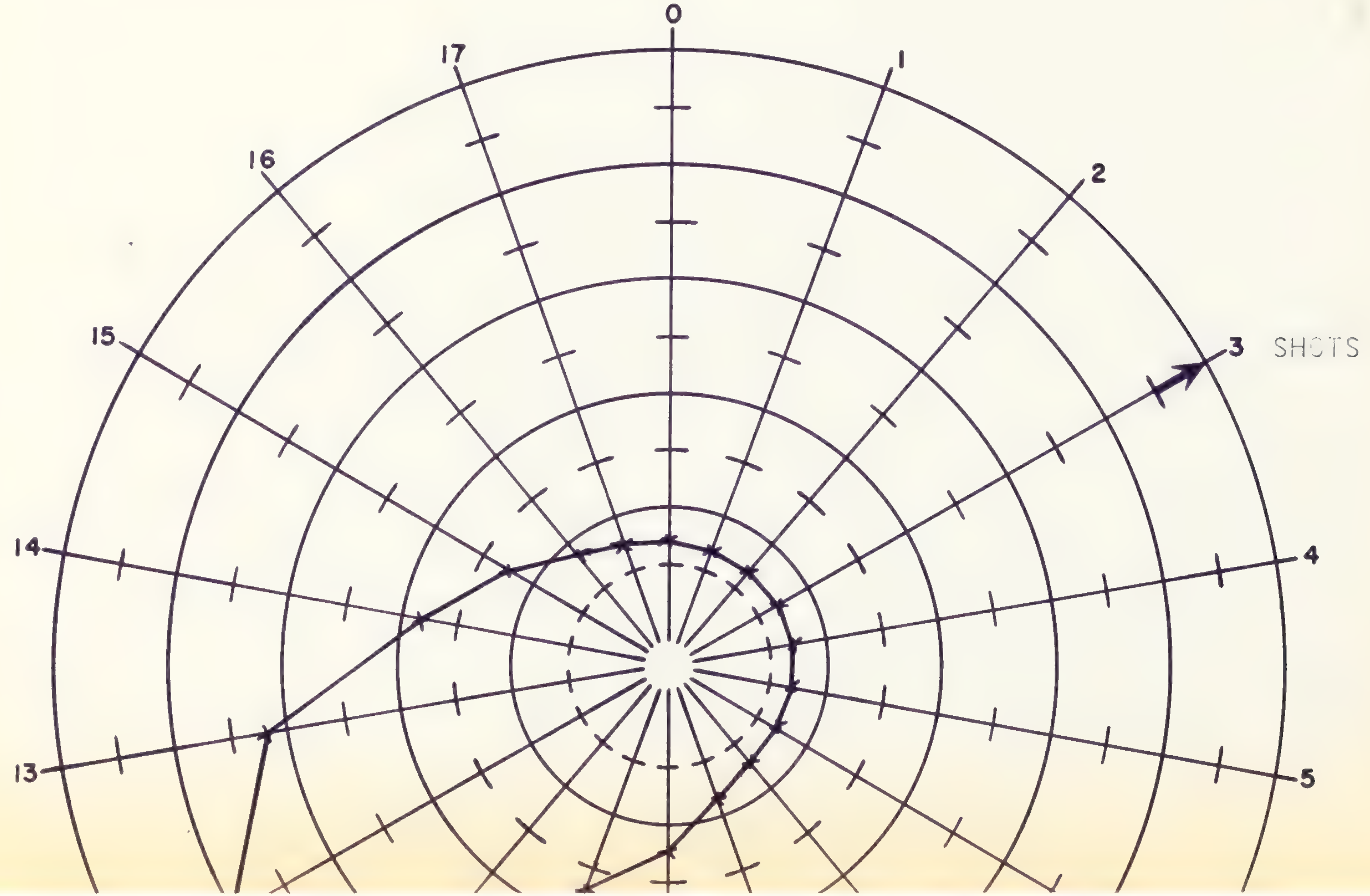
This chart, computation and/or interpretation of our readings from our [illegible] [illegible] and/or testing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are set out on the reverse side of our Service Order for this job. The readings could be otherwise affected by [illegible] [illegible] of the drill hole and other conditions unknown to us.

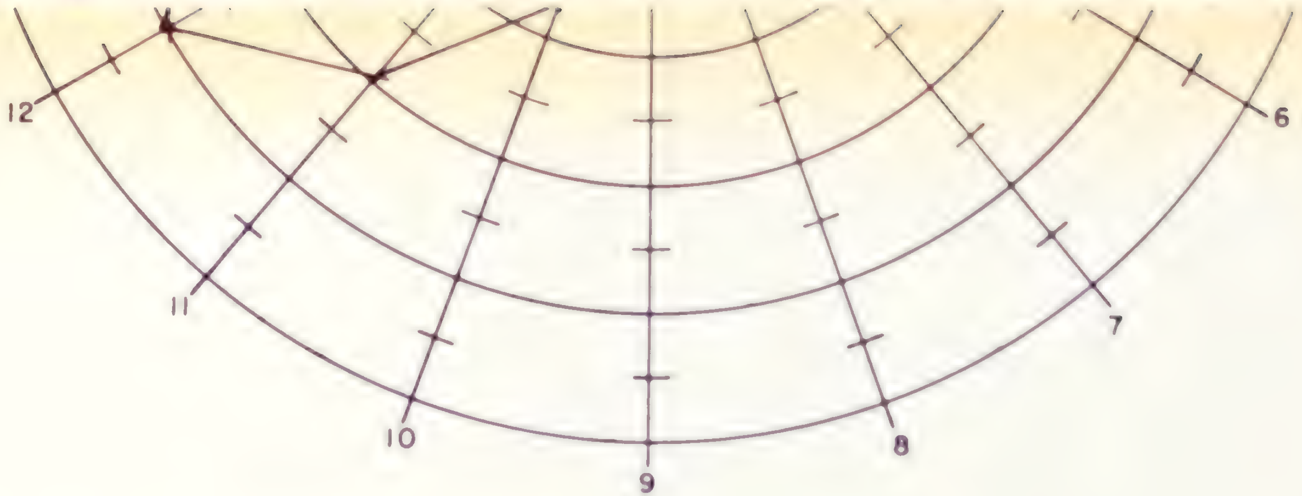
Schlumberger

RADIORIENTATION PLOT

POT-B

[illegible] SHORT STRING-PERFORATED 885-895 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our [illegible] testing instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are repeated on the reverse side of our Service Order for this job. The readings could be adversely affected by conditions in the drill hole and other conditions unknown to us.

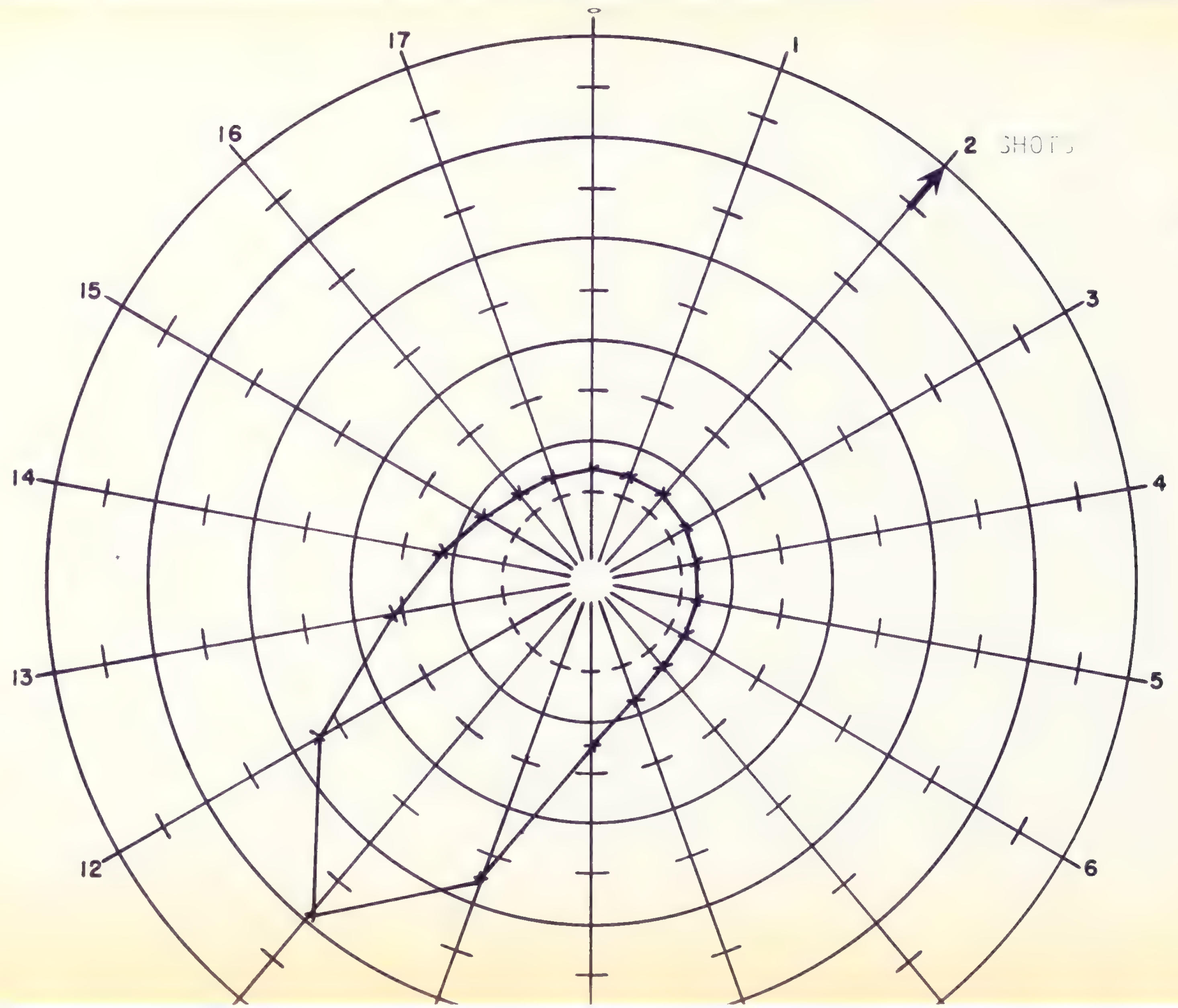
RADIORIENTATION PLOT

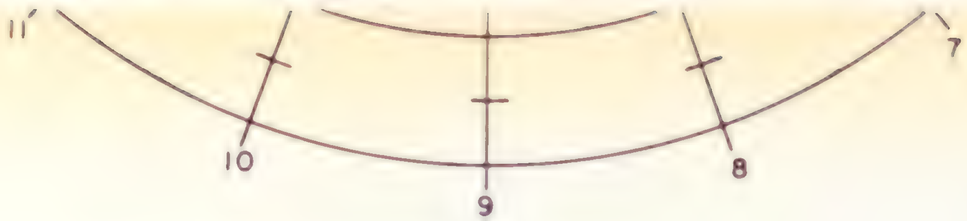
POT-B

[illegible]

0

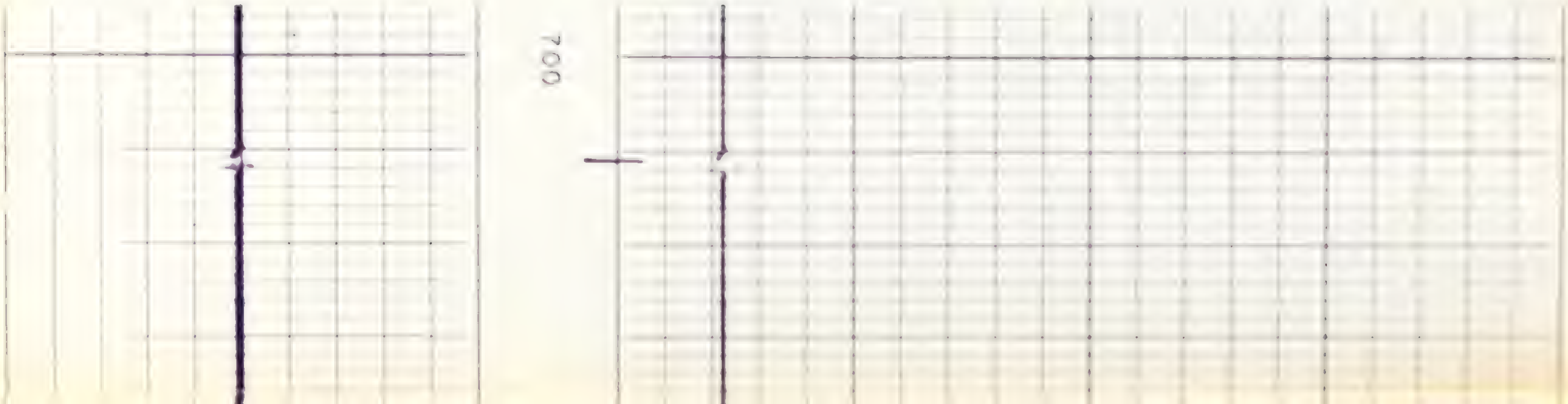
RADIORIENTATION PLOT
POT B

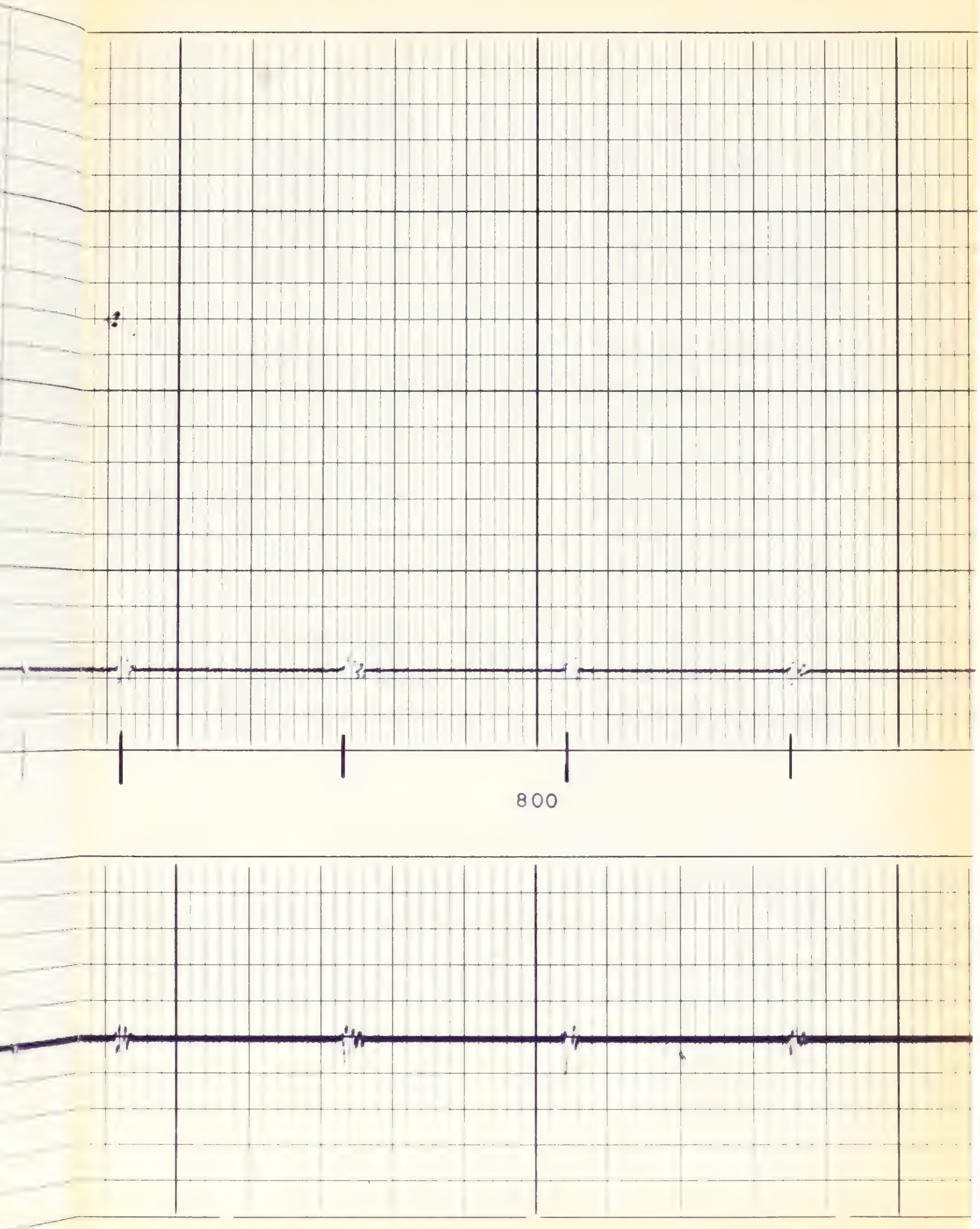


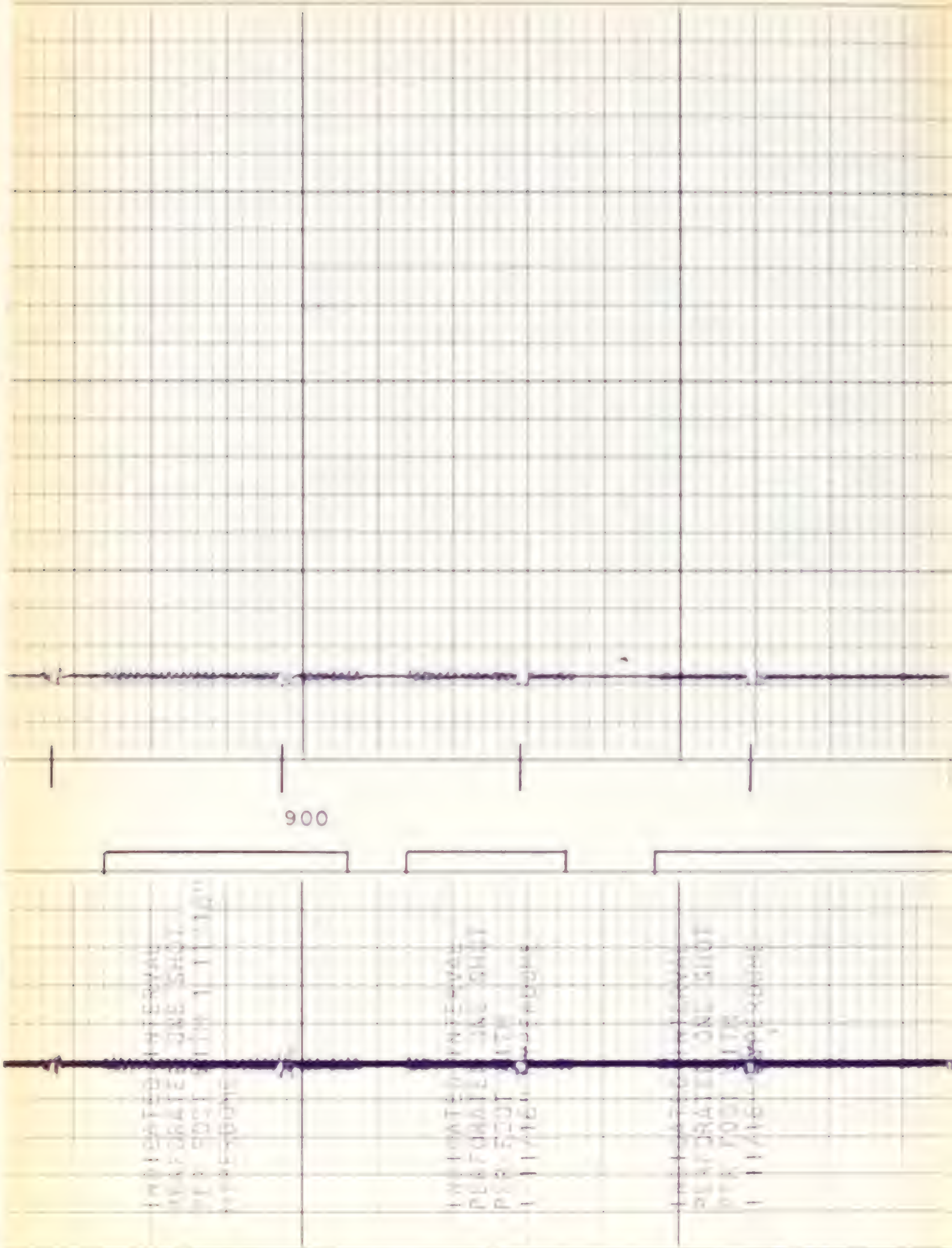


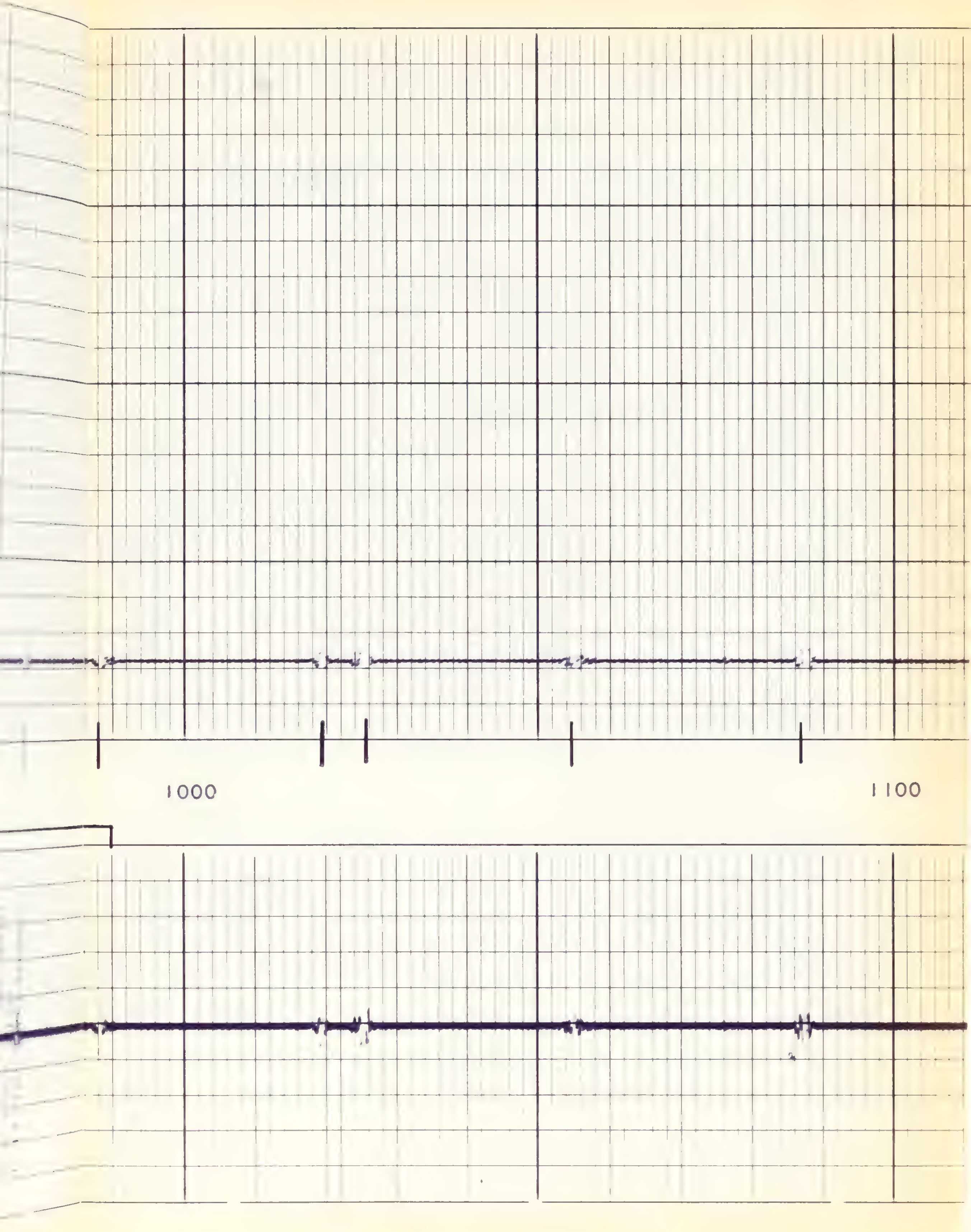
This chart, computation and/or interpretation of any readings from our [illegible] and de- testing instrument is provided to you in accordance with, and subject to, the General Terms and Conditions as are set out on pages [illegible] of our current Price Schedule [illegible] side of our Service Order for this job. The readings could be adversely affected by [illegible] in the drill hole and other conditions unknown to us.

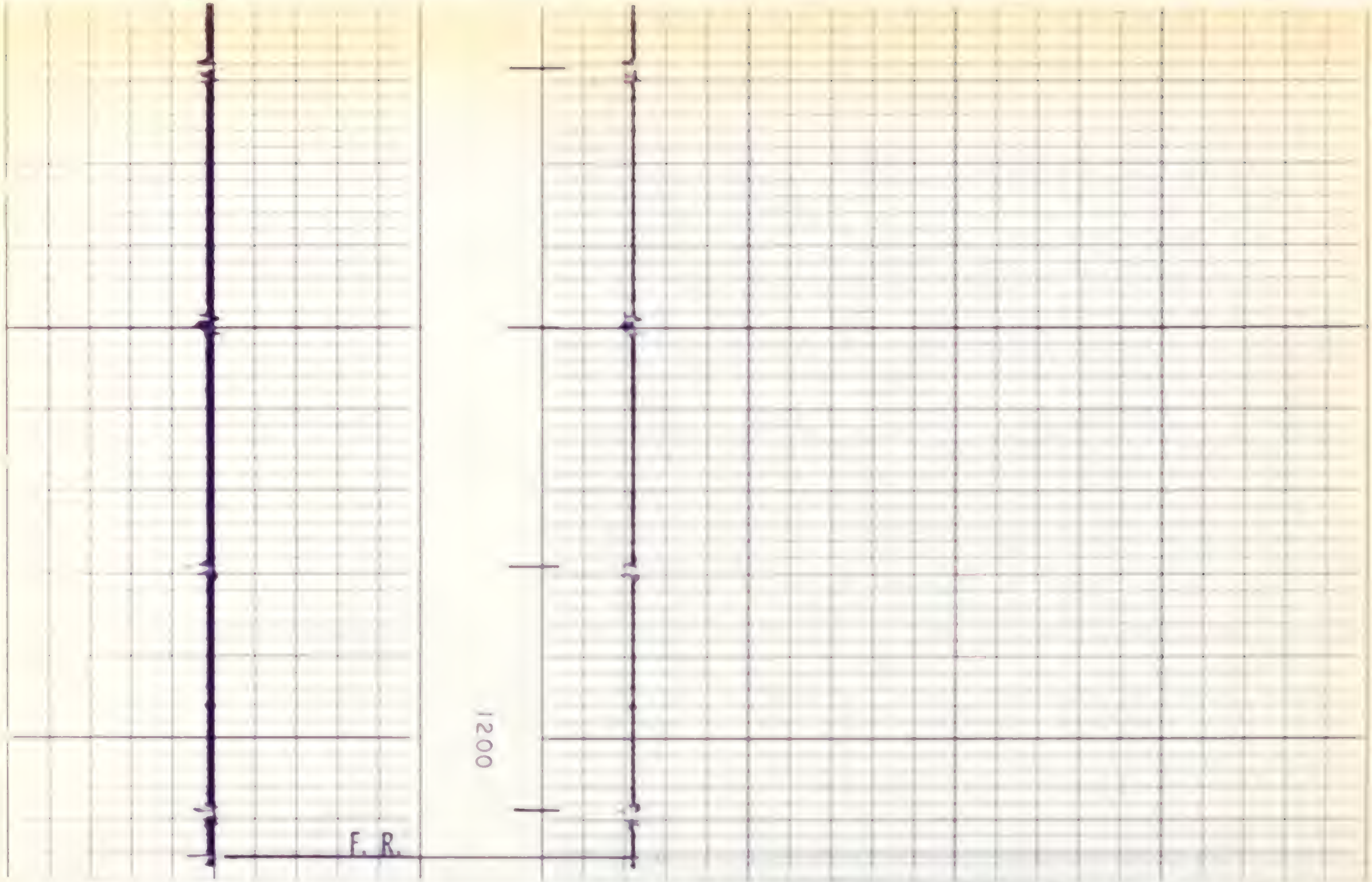
Schlumberger




800


900
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


1000
1100



COMPANY ATLANTIC RICHFIELD COMPANY

WELL [illegible]

COMPANY [illegible]

WELL [illegible]

FIELD [illegible]

RIO BLANCO, COLORADO

Schlumberger

PRODUCTION LOGGING SERVICES

SWS-1425-B

Schlumberger

CEMENT BOND LOG

VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION SORGHUM GULCH
WELL S.G. NO. 1
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G.NO.1

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION 1[illegible]4[illegible]' FE[illegible] & 1[illegible]14' FS[illegible]
API Serial No. 6929

Sec. [illegible] Twp. 3S Rge. 97W

Other Services:
PDC-GR
SP-HD

Permanent Datum: GROUND LEVEL, Elev. 6428
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6428

Date	3/11/75	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	[illegible]436	Max. Rec. Temp.	---- °F
Depth — Logger	[illegible]13[illegible]	Est. Cement Top	1400
Btm. Log Interval	21[illegible]1	Equip. | Location	5641 | VERNAL
Top Log Interval	1[illegible]	Recorded By	ST. AUBYN
Open Hole Size	6 3/4	Witnessed By	MR. DON TAIT

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8			T-C	SURF	154
String (1)	2 3/8	4.7		T-C	SURF	2519
String (2)	2 3/8	4.7		T-C	SURF	1[illegible]34
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			385 SKS.	
Type of cement			CLASS "G"	
Additive			1% CAL-CHLOR.	
			10#/SK-CAL SEAL	
Retarder			1#/SK-FLOW SEAL	
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE The well name, location and borehole reference data were furnished by the customer

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement	11:[illegible] [illegible]-75	
Release pressure	1[illegible] [illegible]-75	
Start Cement Bond Log	16:[illegible] 3-11-75	
Finish Cement Bond Log	[illegible] 3-11-75	

REMARKS

Service Order No. [illegible]

Csg. Collars Recorded 15 ft. [illegible]

Preceding fluid ______ Volume ______ bbls.

Cement pumped ______ bbls./minute

Pipe reciprocated during Pumping: Yes [illegible] No ______

Pipe reciprocated after plug down: Yes ______ min. No ______

SQUEEZE JOB DETAIL

Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

EQUIPMENT DATA

	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SLP-FH [illegible]	
Sonic Cart No.	[illegible]	
Sonic Sonde No.	[illegible]	
CRP No.	16	
Mem Panel No.	---	
GR Panel No.	---	
GR Cart No.	---	
Centralizer: Type	[illegible]	
No.	[illegible]	
To Level (MV)	[illegible]	
Cart. Gain	60	
CRP Intensity	.1	
R9G Intensity	[illegible]	
Logging Speed	[illegible] FPM	
Time Constant		

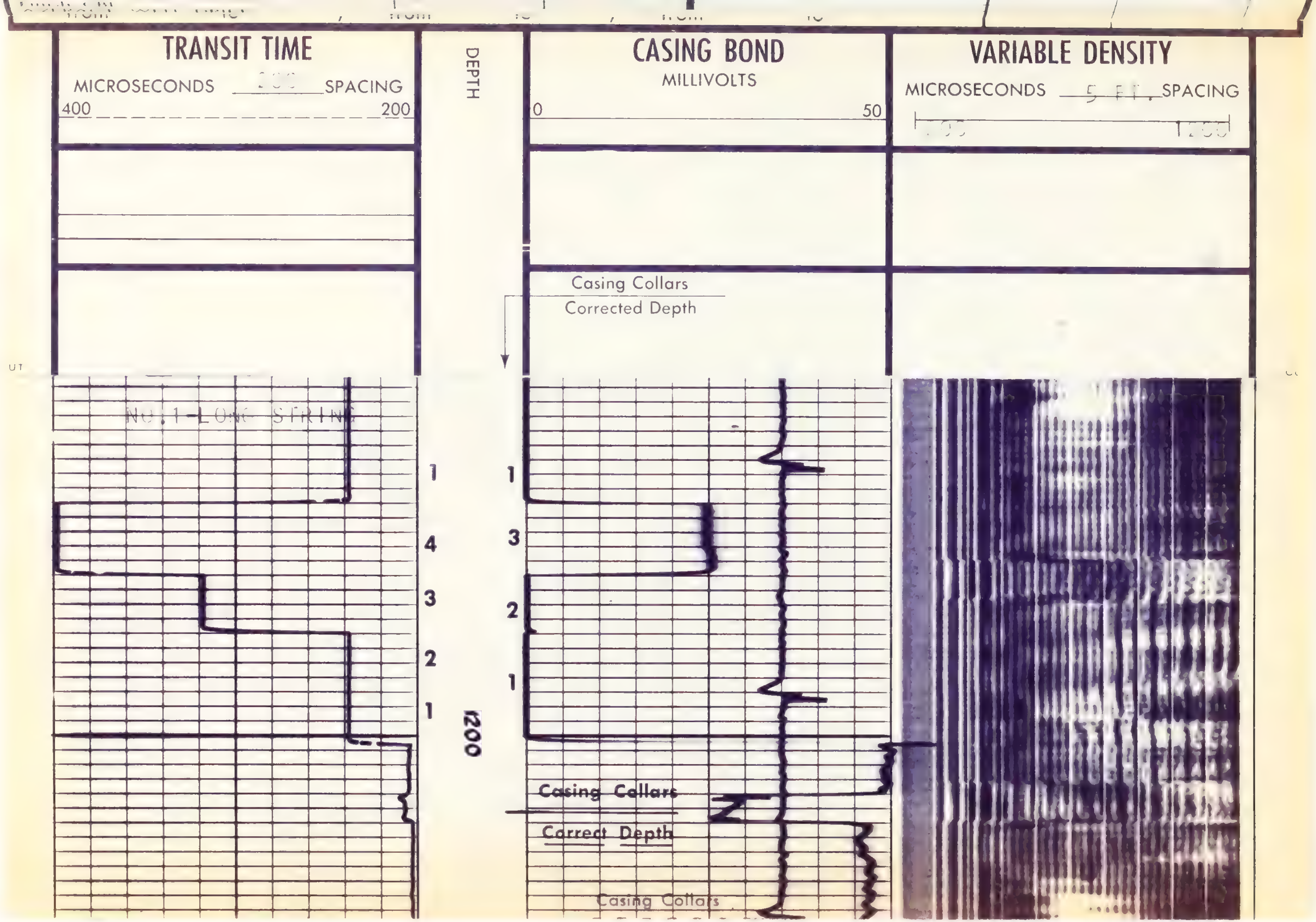
AVERAGE WELL DRIFT:

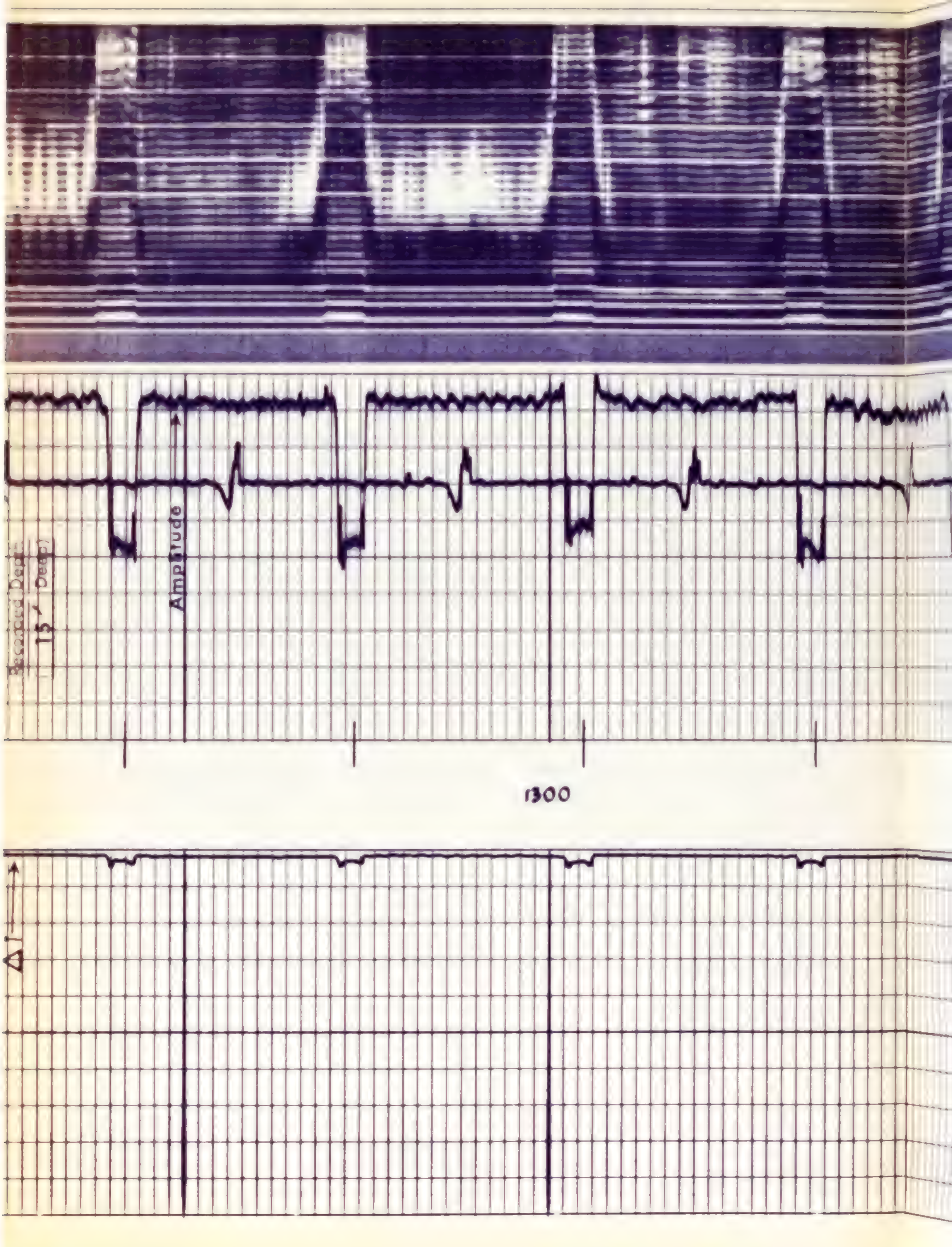
from ______ to ______ ; from ______ to ______ ; from ______ to

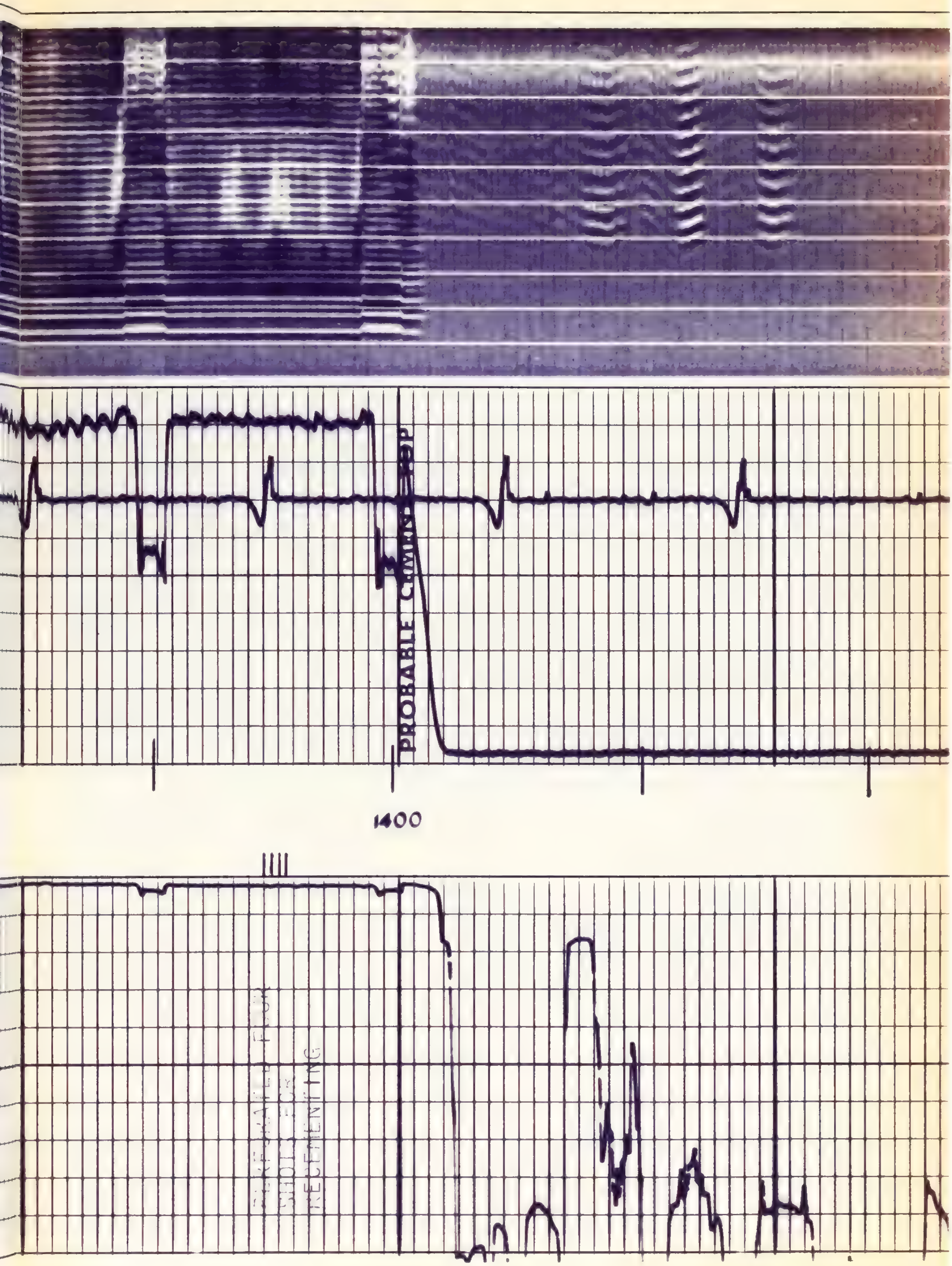
TRANSIT TIME

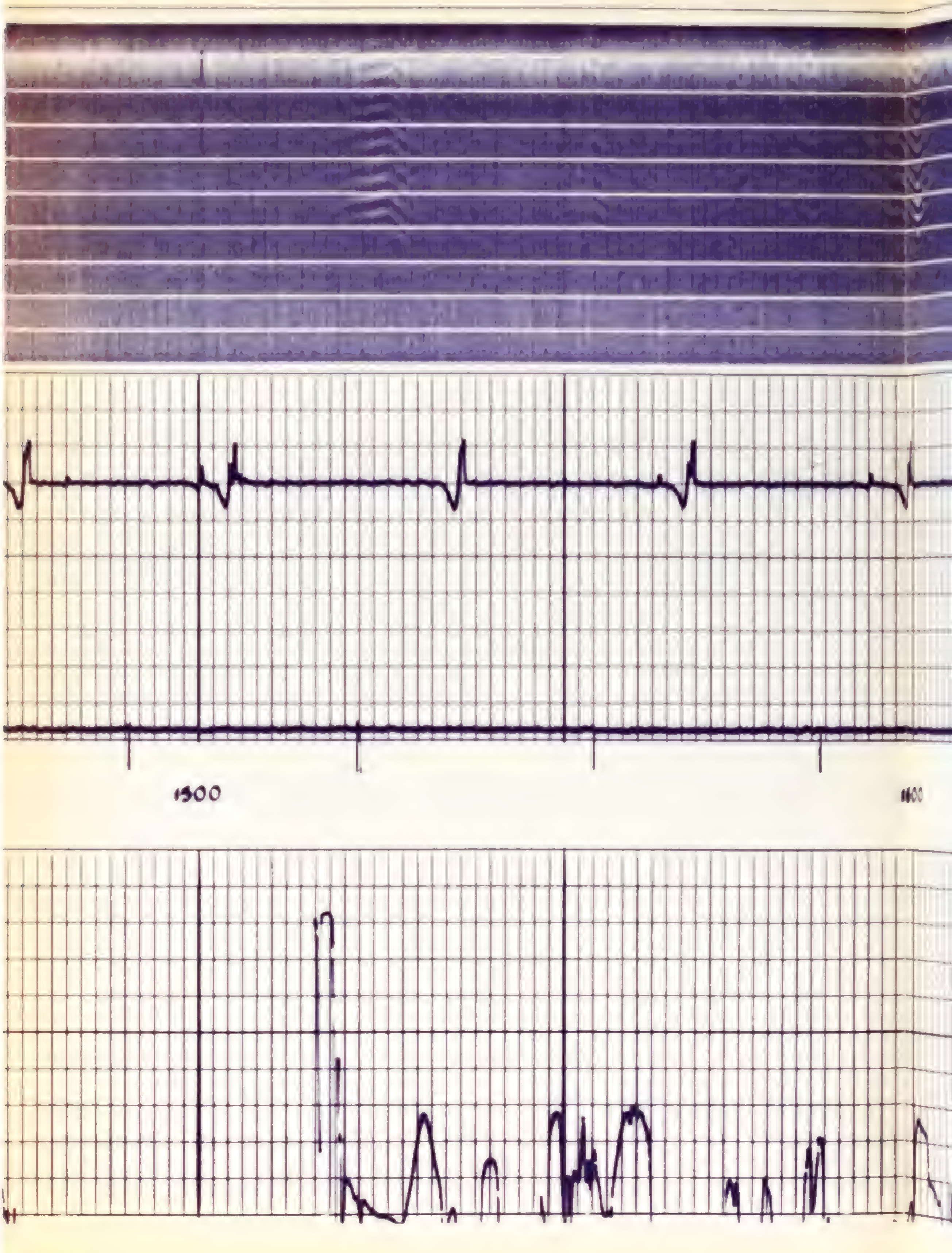
CASING BOND

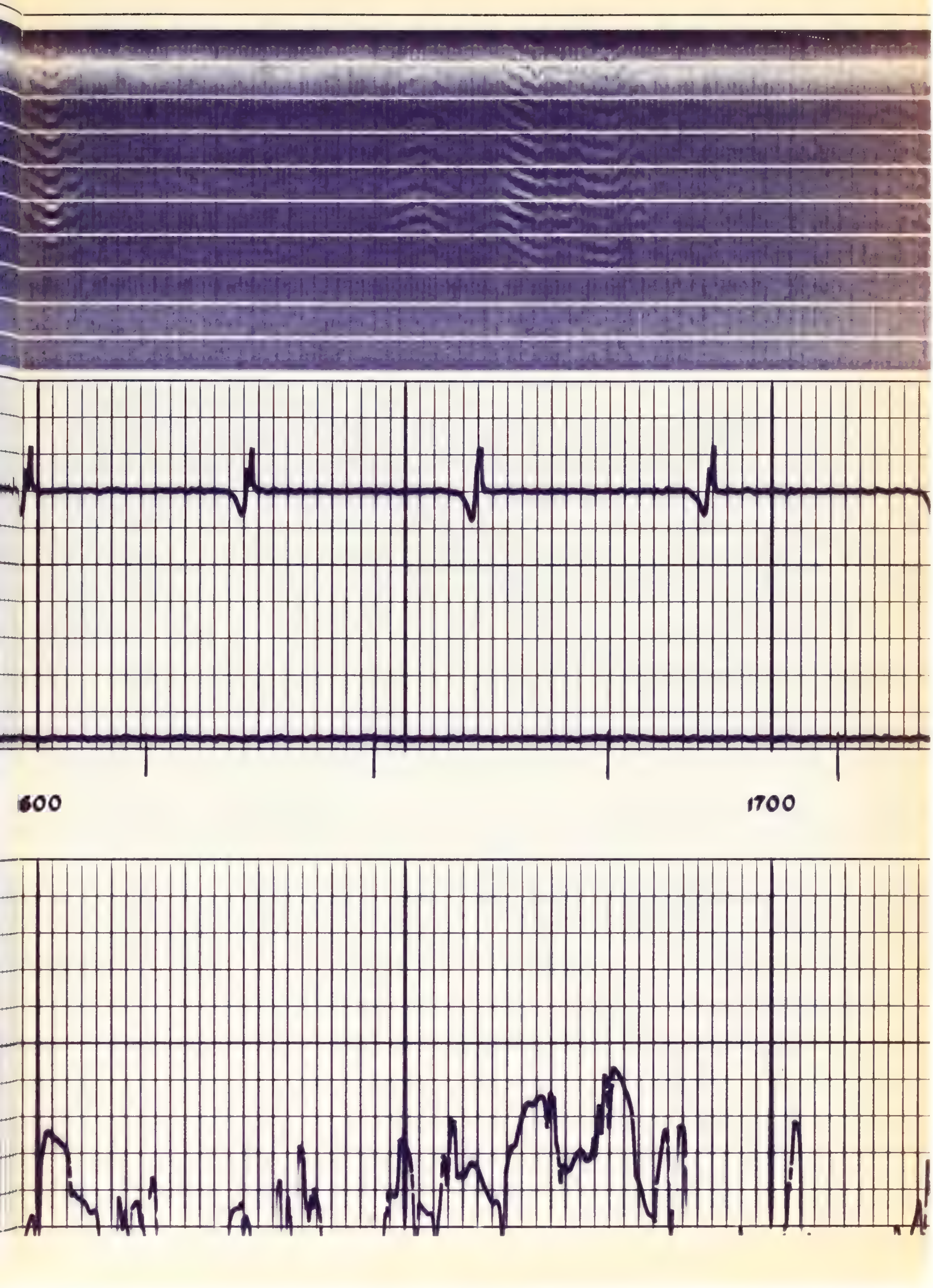
VARIABLE DENSITY

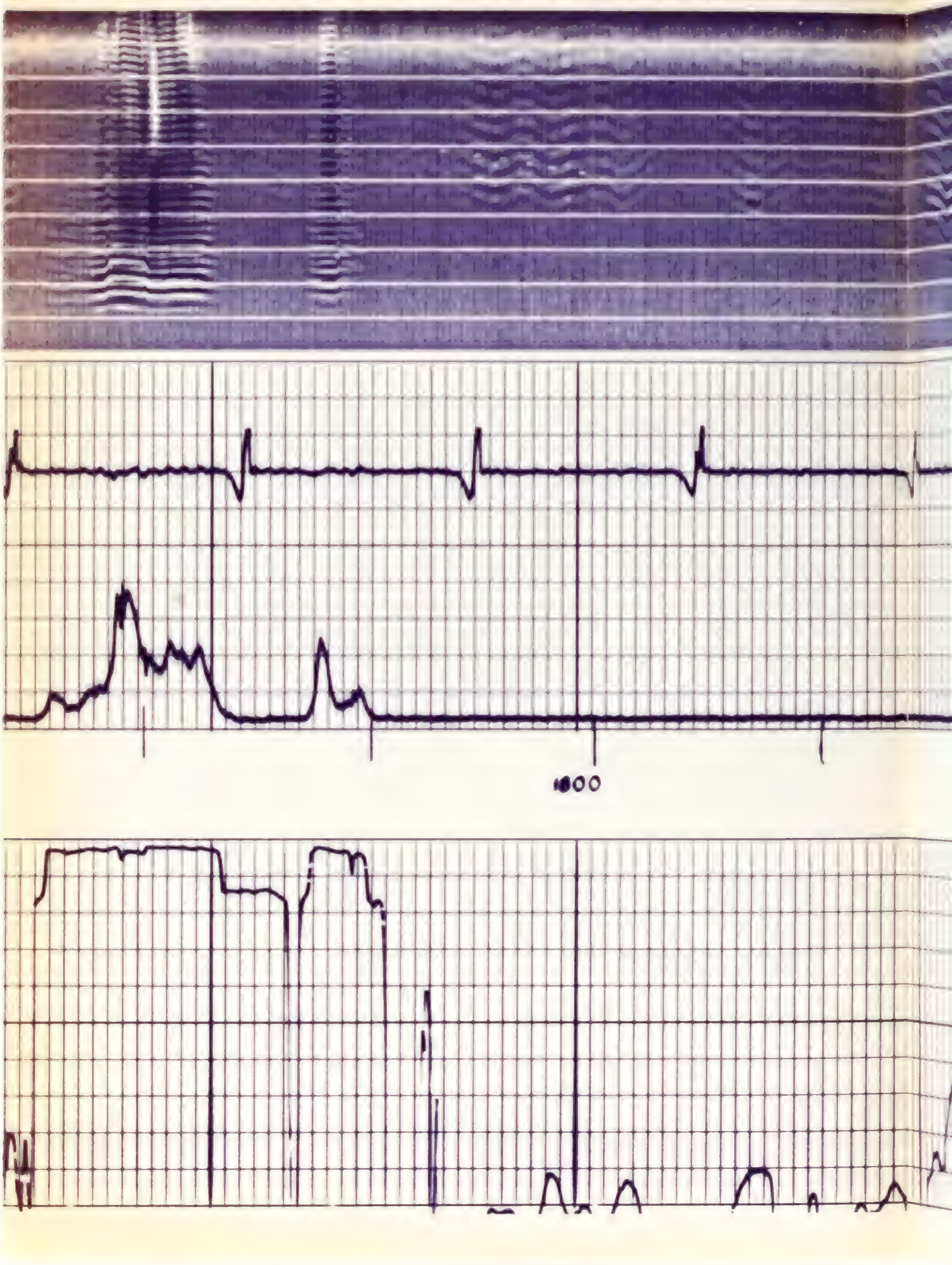

TRANSIT TIME
MICROSECONDS SPACING
400
200
DEPTH
CASING BOND
MILLIVOLTS
0
50
VARIABLE DENSITY
MICROSECONDS 5 FT. SPACING
Casing Collars
Corrected Depth
NO. 1-LONG STRING
1
4
3
2
1
1
3
2
1
1200
Casing Collars
Correct Depth
Casing Collars

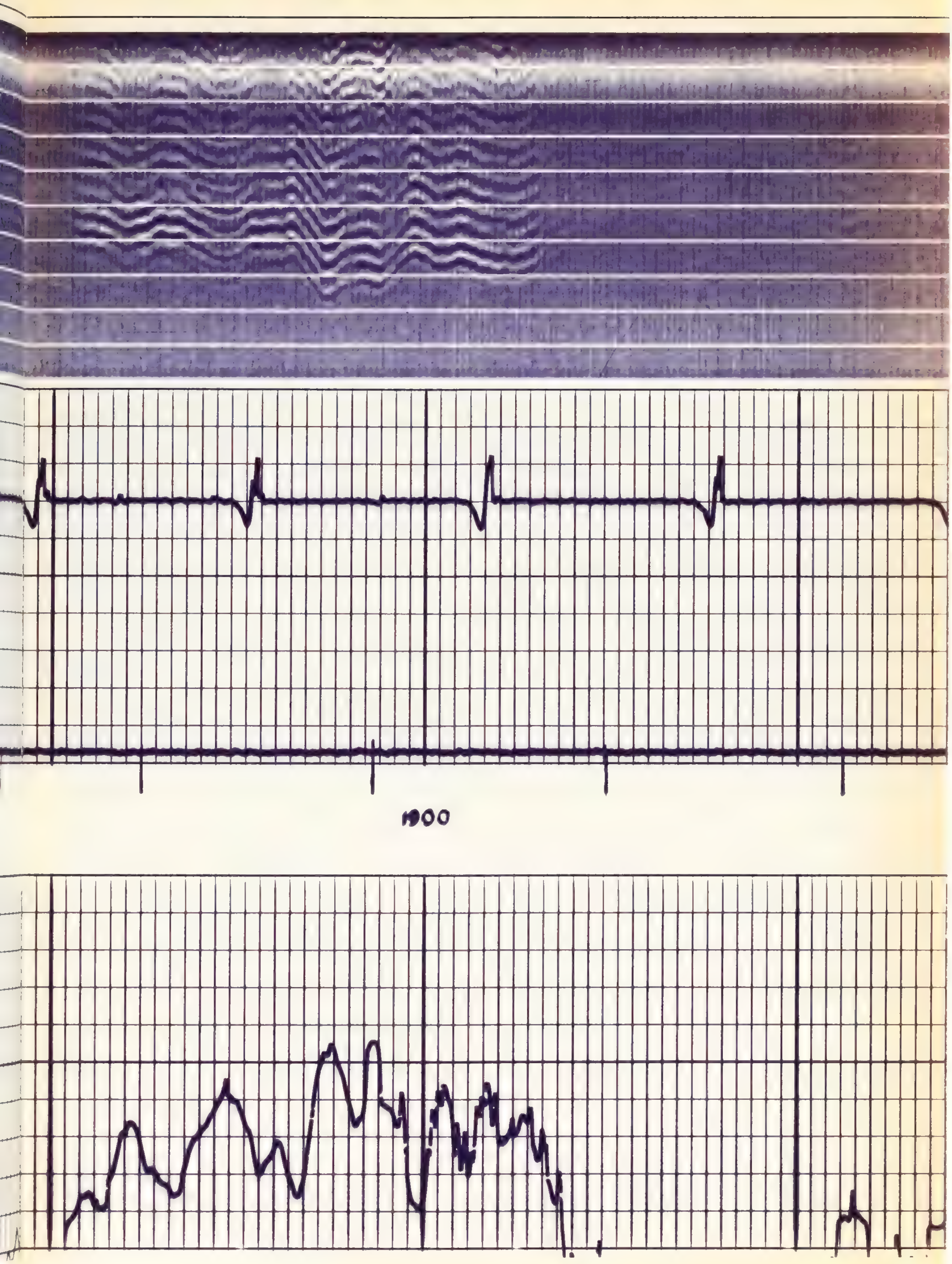

Recorded Depth
15' Deep)
Amplitude
1300
ΔI

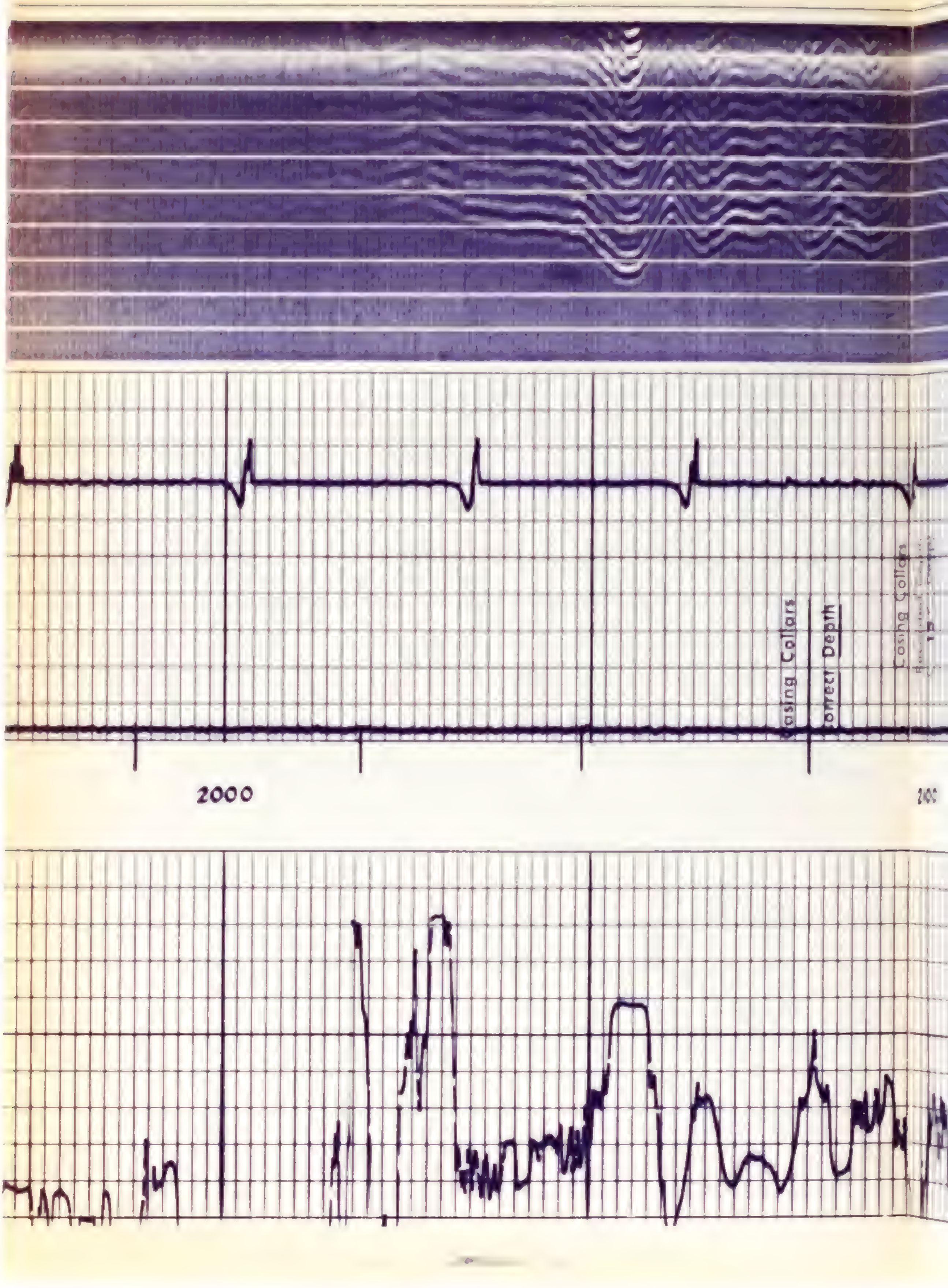

PROBABLE COMMENT STOP
1400
IIII
RECEMENTING


1500
1600

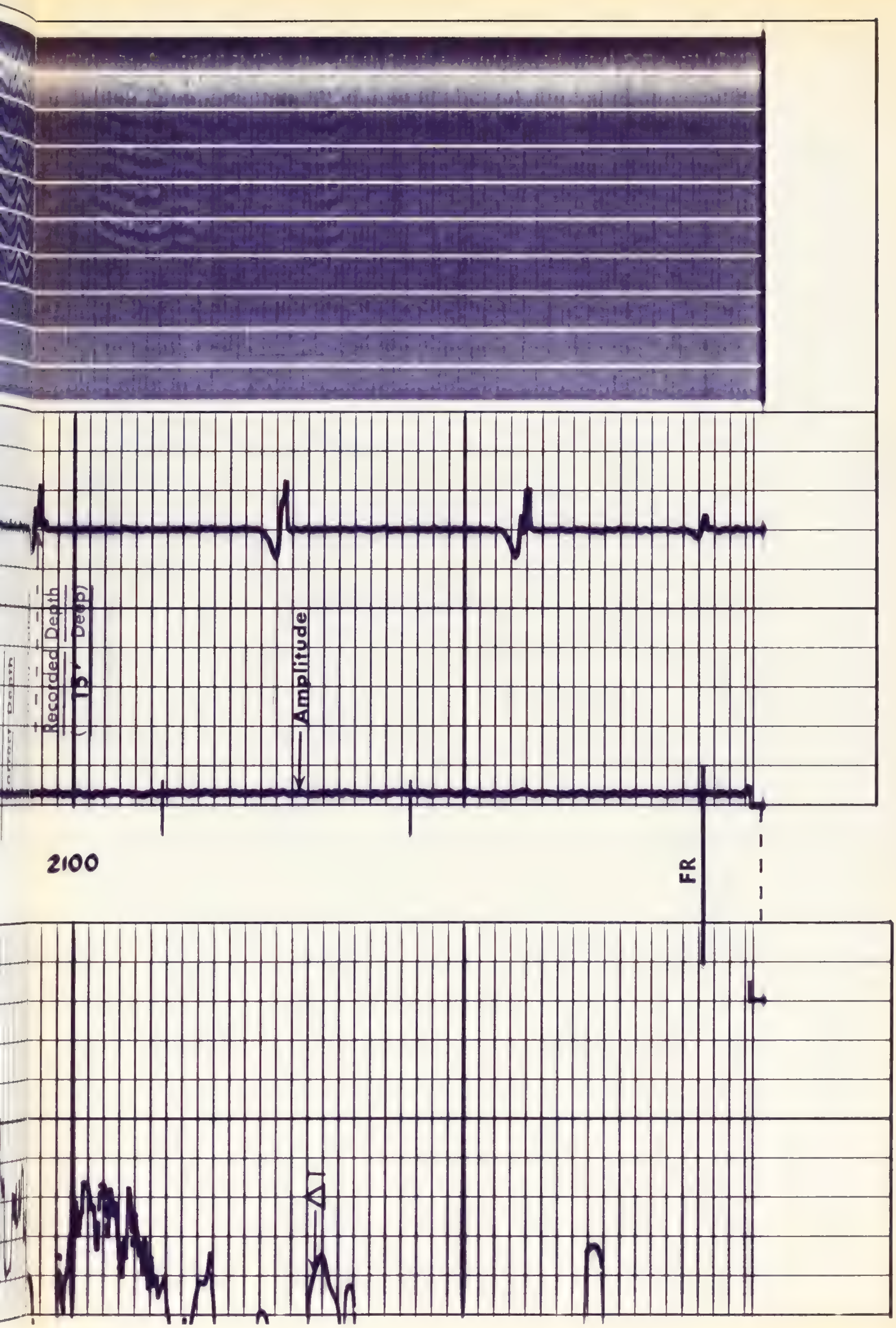

600
1700


1800

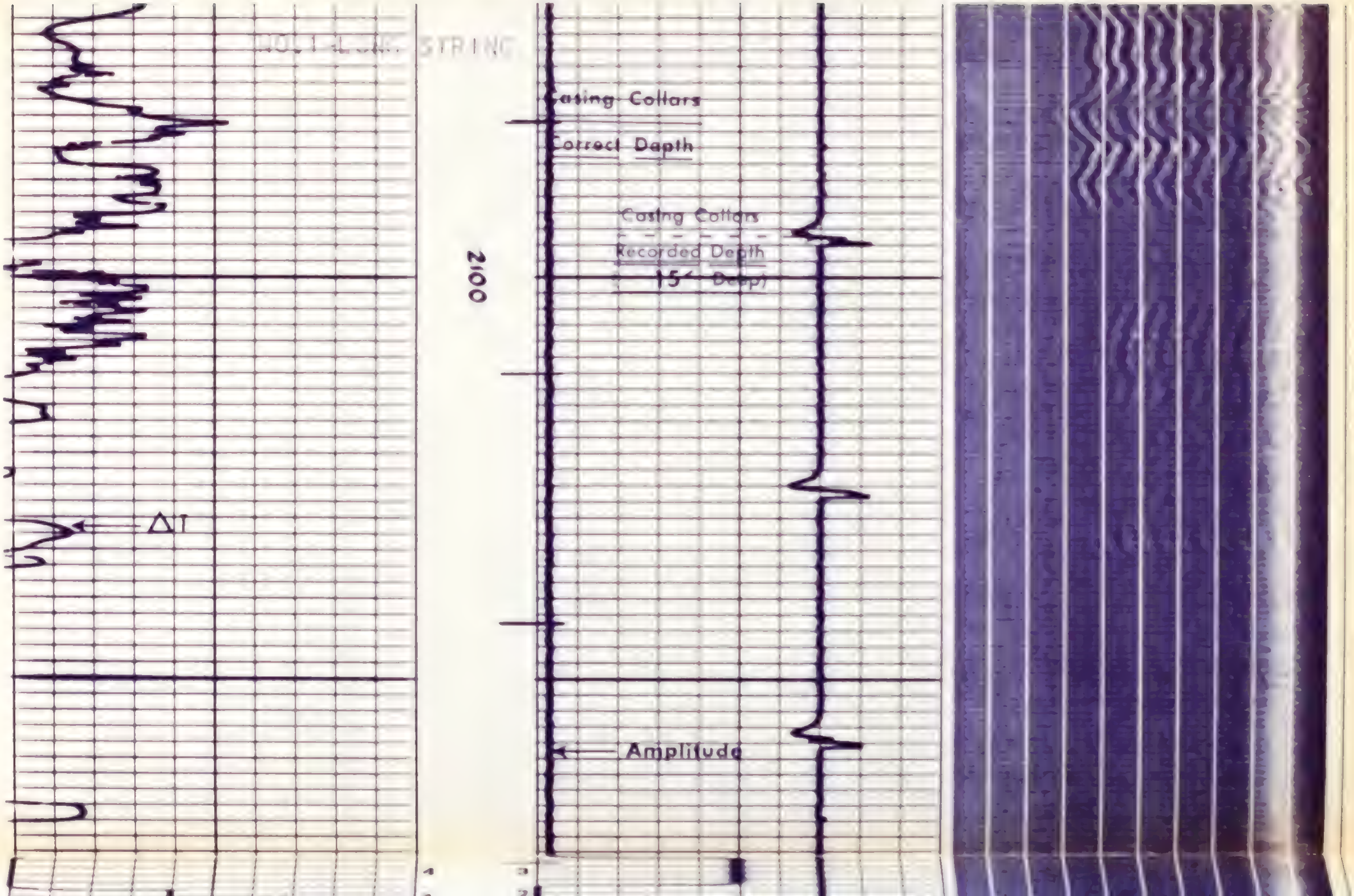

1900

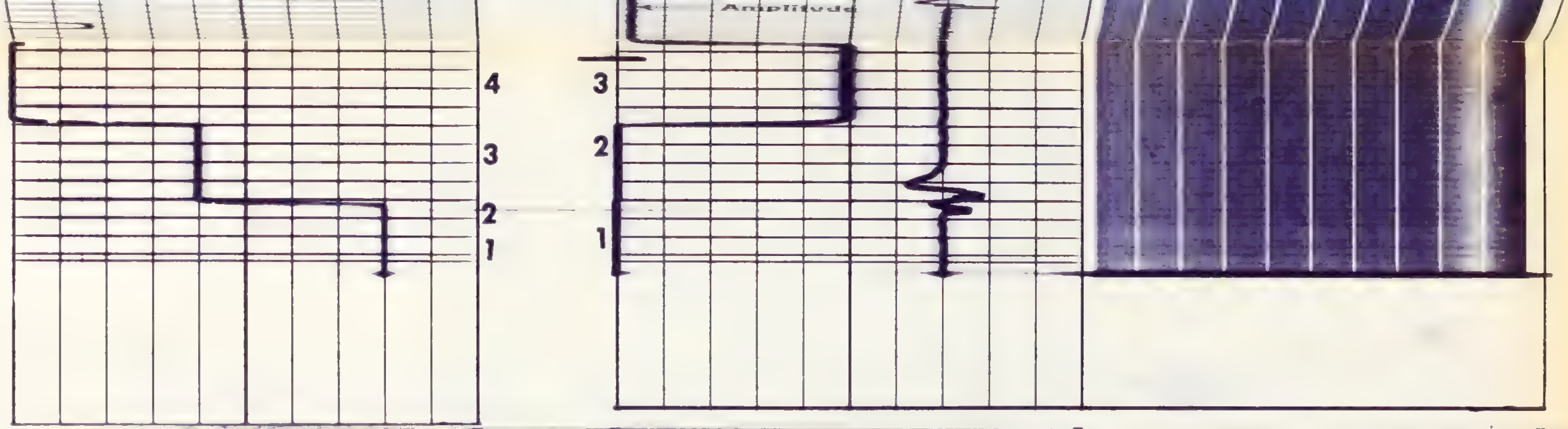


Casing Collars
Correct Depth
2000
2100
Casing Collars


Recorded Depth
(15' Deep)
Amplitude
2100
FR
ΔT

REPEAT SECTION





Casing Collars
Corrected Depth

DEPTH

TRANSIT TIME
MICROSECONDS 200 SPACING
400 200

CASING BOND
MILLIVOLTS
0 50

VARIABLE DENSITY
MICROSECONDS 5 FT SPACING
200 1200

COMPANY ATLANTIC RICHFIELD COMPANY
WELL S.G. NO. 1
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2119
SCHL. TD 2131
DRLR TD 2486
Elev:
KB
DF
GL 6418

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1	MECHANICAL ZERO	MECHANICAL ZERO
2	240 μ sec	ELECTRICAL ZERO
3	320 μ sec	CALIBRATE
4	400 μ sec	

Schlumberger

CEMENT BOND LOG

COUNTY [illegible]
Field or LOCATION [illegible]
WELL [illegible]
COMPANY [illegible]

COMPANY [illegible]

WELL [illegible]

FIELD [illegible]

COUNTY [illegible] STATE [illegible]

LOCATION
API Serial No. [illegible]
Sec. [illegible] Twp. [illegible] Rge. [illegible]

Other Services: [illegible]

Permanent Datum: [illegible], Elev. [illegible]
Log Measured From [illegible], [illegible] Ft. Above Perm. Datum
Drilling Measured From [illegible]

Elev.: K.B. [illegible]
D.F. [illegible]
G.L. [illegible]

Date	[illegible]	Type Drill Fluid	[illegible]
Run No.	[illegible]	Fluid Level	[illegible]
Depth — Driller	[illegible]	Max. Rec. Temp.	[illegible] °F
Depth — Logger	[illegible]	Est. Cement Top	[illegible]
Btm. Log Interval	[illegible]	Equip. | Location	[illegible] | [illegible]
Top Log Interval	[illegible]	Recorded By	[illegible]
Open Hole Size	[illegible]	Witnessed By	[illegible]

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String				[illegible]	[illegible]	[illegible]
String	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
String		4.7		T-	[illegible]	[illegible]
Liner						

	PRIMARY CEMENTING DATA			
STRING	Surface	Protection	Production	Liner
Vol. of cement			[illegible]	
Type of cement			[illegible]	
Additive			[illegible]	
			[illegible]	
Retarder			[illegible]	
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

The well name, location and borehole reference data were [illegible] by the [illegible]

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement	[illegible]	
Release pressure	[illegible]	
Start Cement Bond Log	[illegible]	
Finish Cement Bond Log	[illegible]	

REMARKS
Service Order No. [illegible]
Csg. Collars Recorded [illegible] ft

Preceding fluid ____________ Volume ____________ bbls.
Cement pumped ____________ bbls./minute
Pipe reciprocated during Pumping: Yes ______ No ______
Pipe reciprocated after plug down: Yes ______ min. No ______

SQUEEZE JOB DETAIL

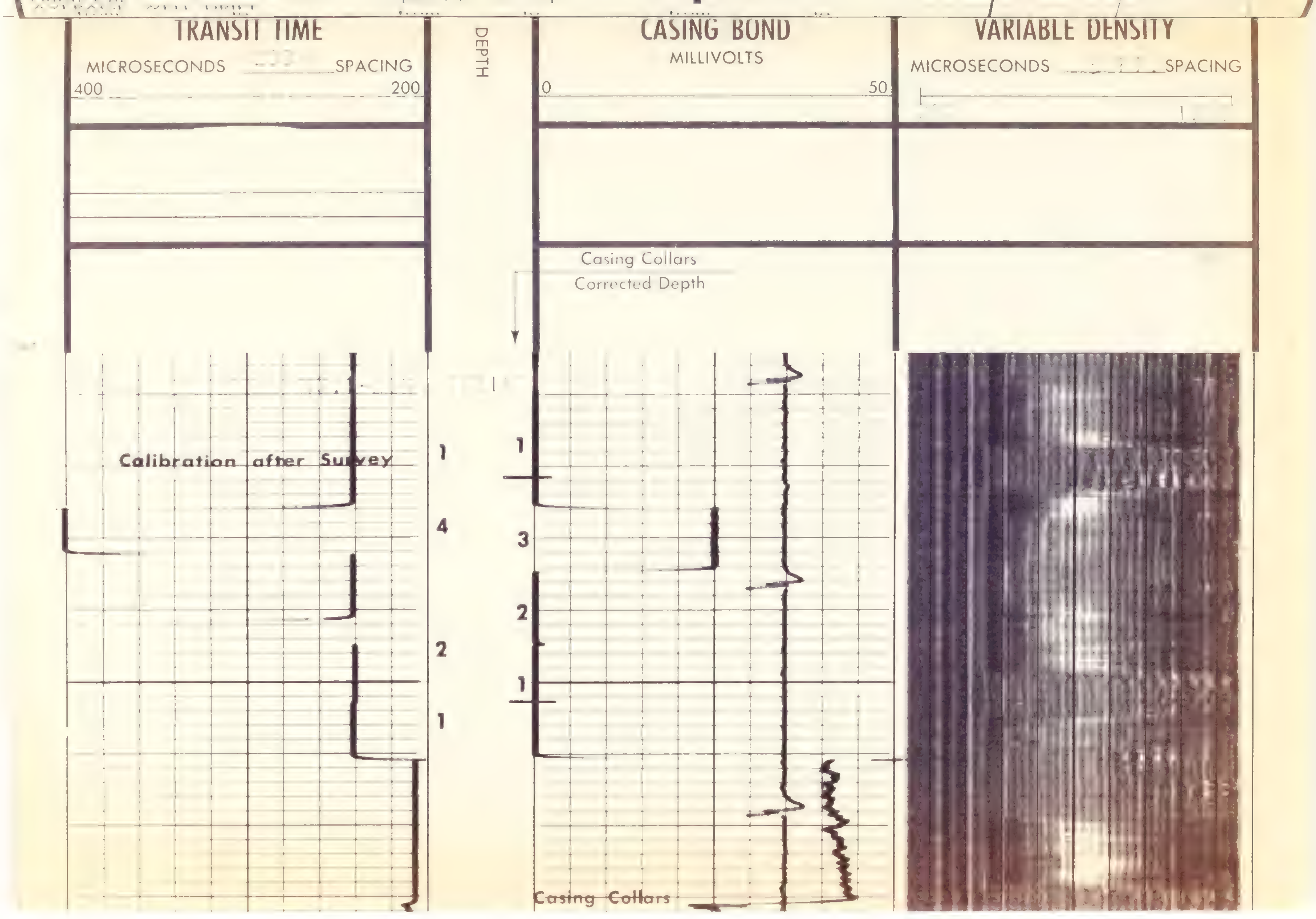
Squeeze number	1	2
Date	[illegible]	
Depth interval	[illegible]	
Type cement		
Volume of cement	[illegible]	
Additive		
Retarder		
Weight of slurry		
Preceding fluid	[illegible]	
Breakdown pressure	[illegible]	
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement	[illegible]	
Released pressure	[illegible]	
Start CBL	[illegible]	
Finish CBL	[illegible]	

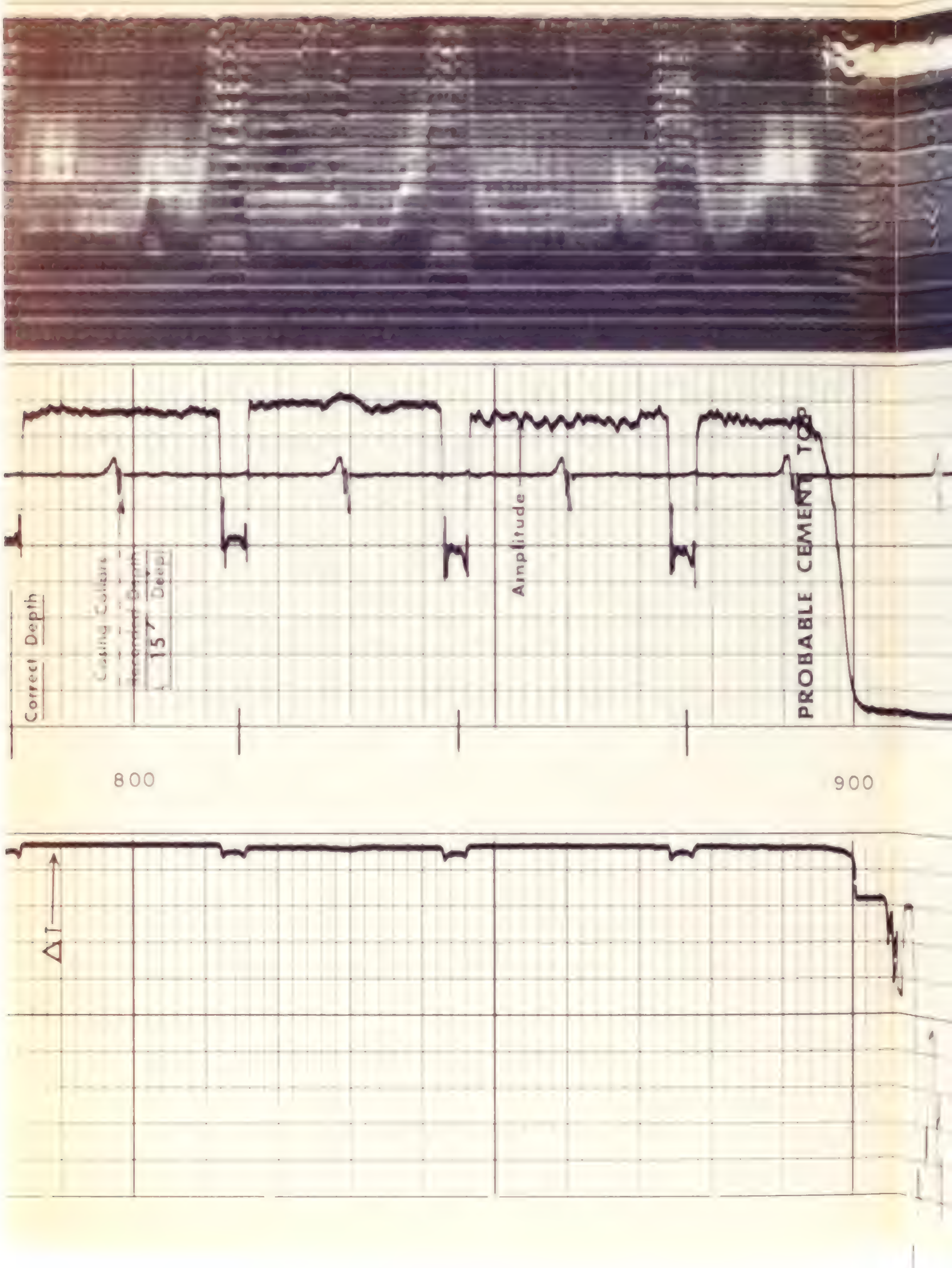
EQUIPMENT DATA

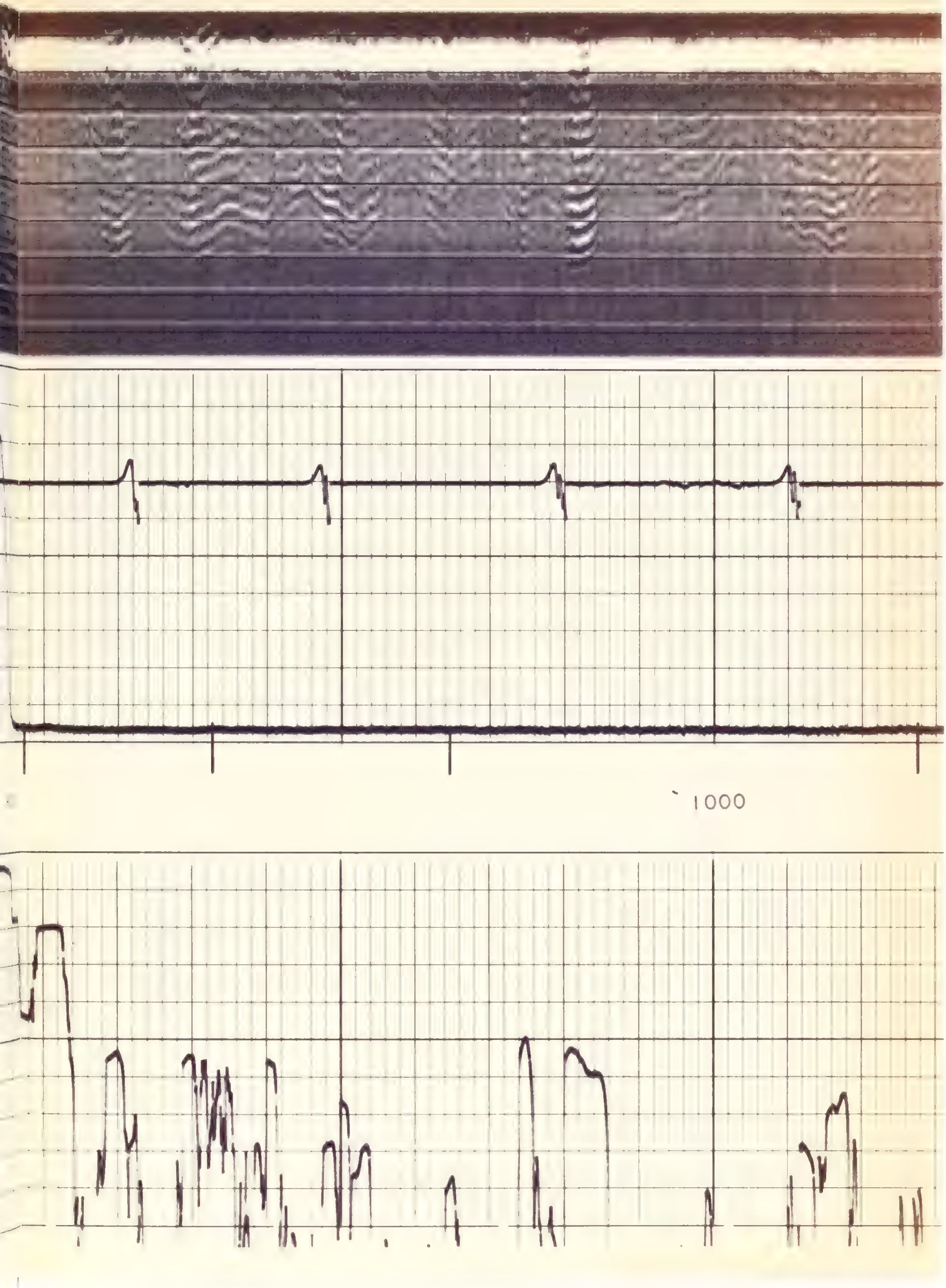
	Centralizer Depths	Scratcher Depths
Sonic Panel No.	[illegible]	[illegible]
Sonic Cart No.	[illegible]	[illegible]
Sonic Sonde No.	[illegible]	[illegible]
CRP No.	[illegible]	
Mem Panel No.	[illegible]	
GR Panel No.		
GR Cart No.		
Centralizer: Type	[illegible]	
No.	[illegible]	
To Level (MV)	[illegible]	
Cart. Gain	[illegible]	
CRP Intensity	[illegible]	
R9G Intensity		
Logging Speed		
Time Constant		

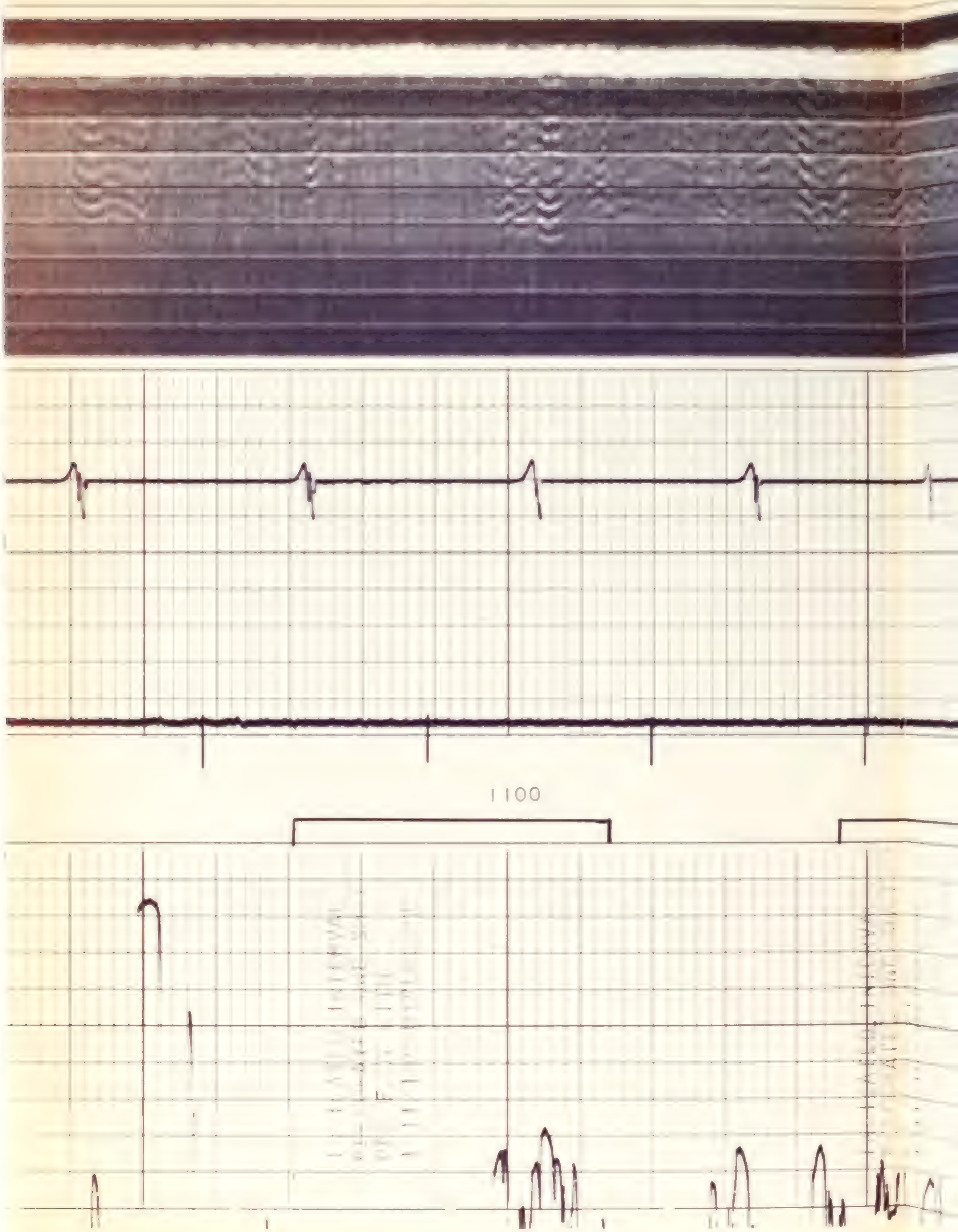
AVERAGE WELL DRIFT:
° from ______ to ______ ; ° from ______ to ______ ; ° from ______ to ______

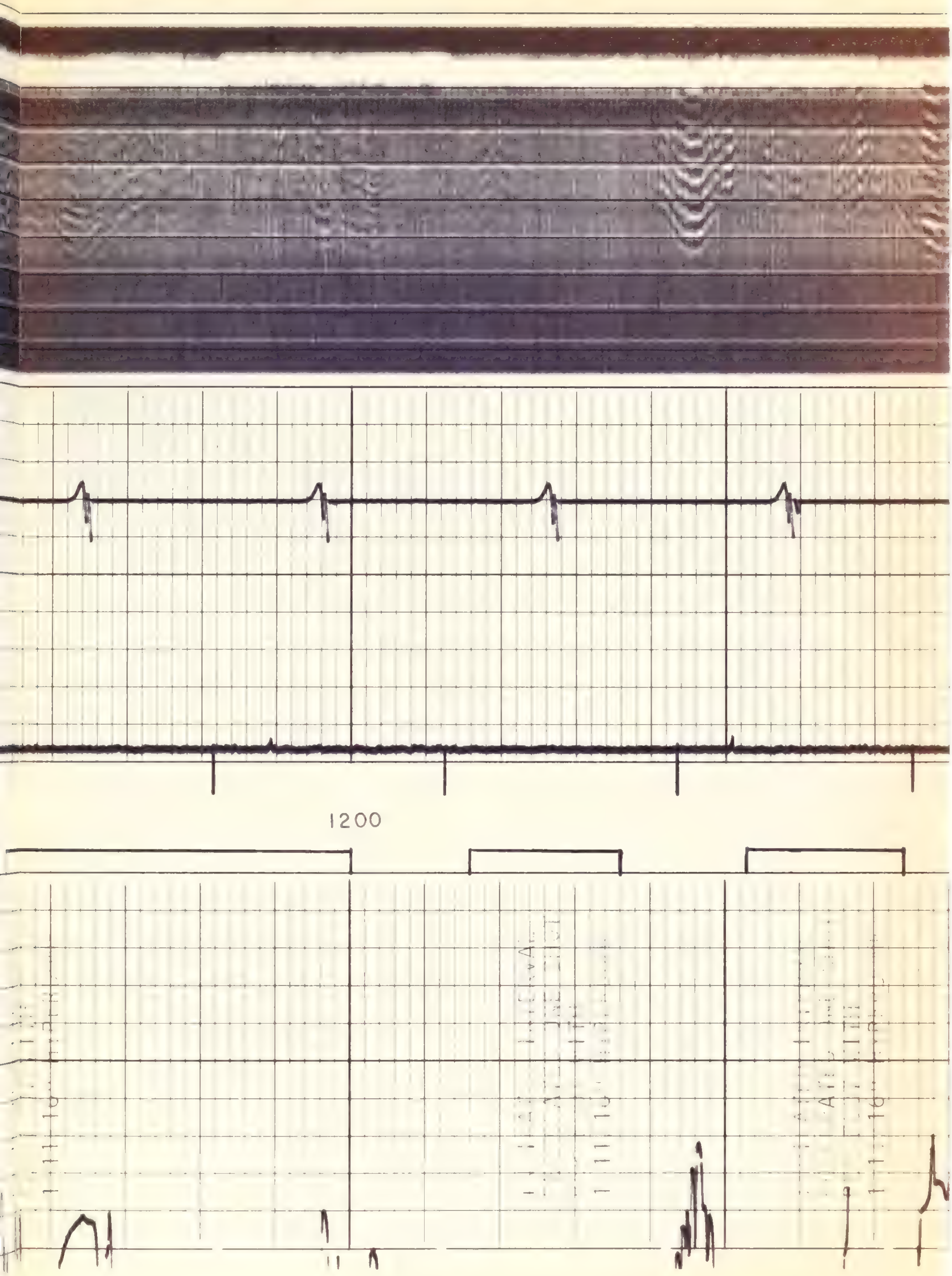
TRANSIT TIME | CASING BOND | VARIABLE DENSITY

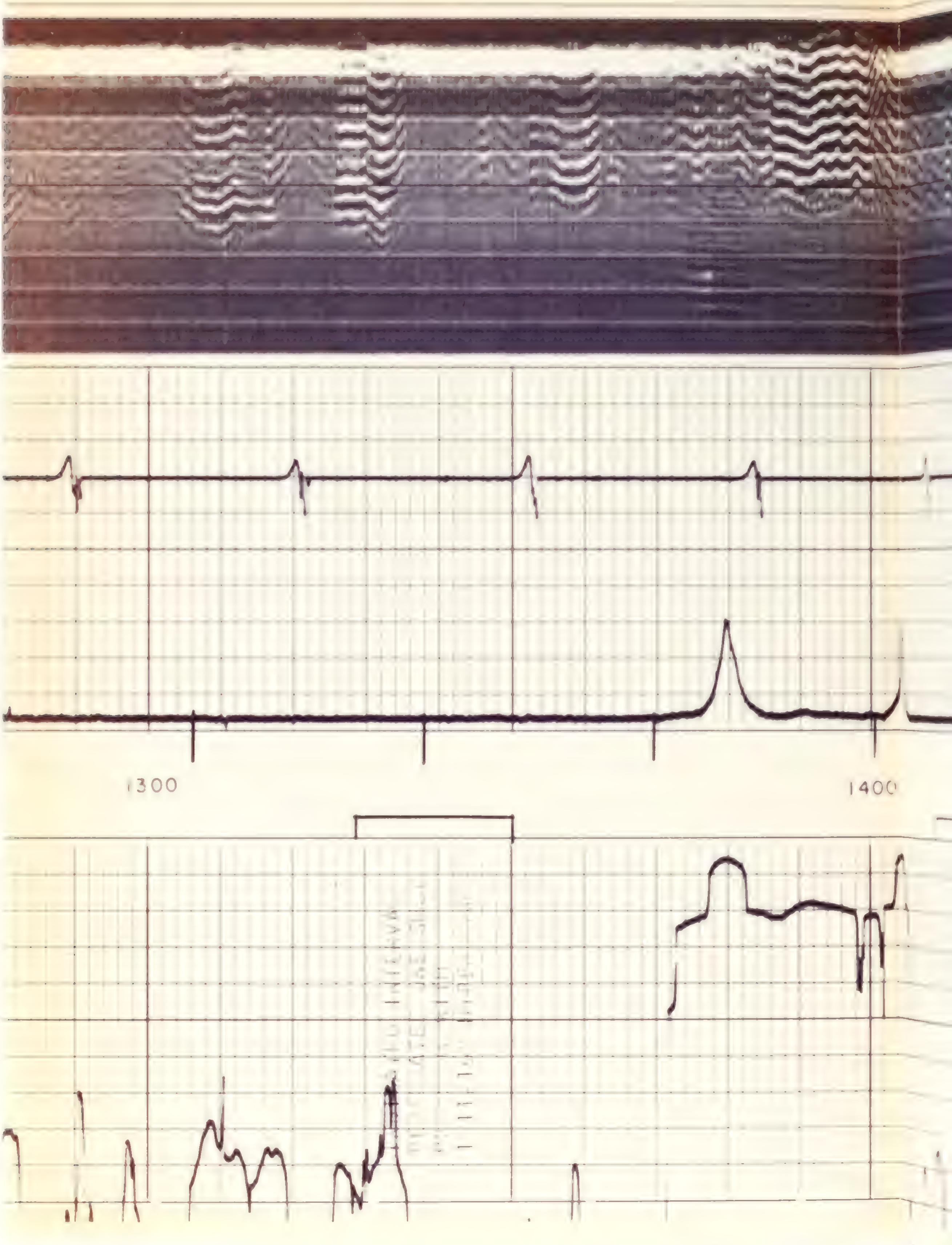

TRANSIT TIME
MICROSECONDS
SPACING
400
200
DEPTH
CASING BOND
MILLIVOLTS
0
50
VARIABLE DENSITY
MICROSECONDS
SPACING
Casing Collars
Corrected Depth
Calibration after Survey
1
4
2
1
1
3
2
1
Casing Collars

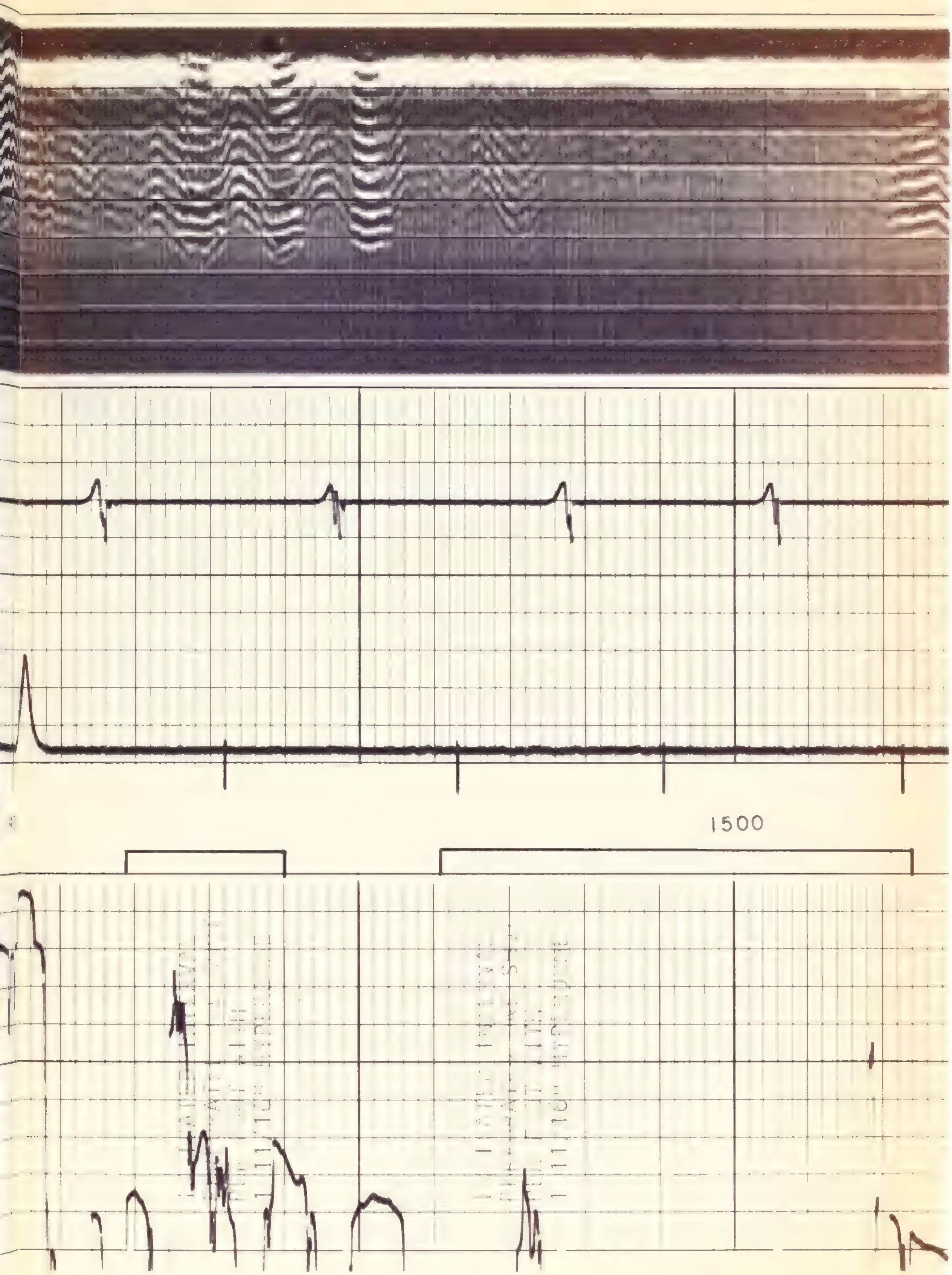

Correct Depth
Casing Collars
Recorded Depth
15' Deep
Amplitude
PROBABLE CEMENT TOP
800
900
ΔT

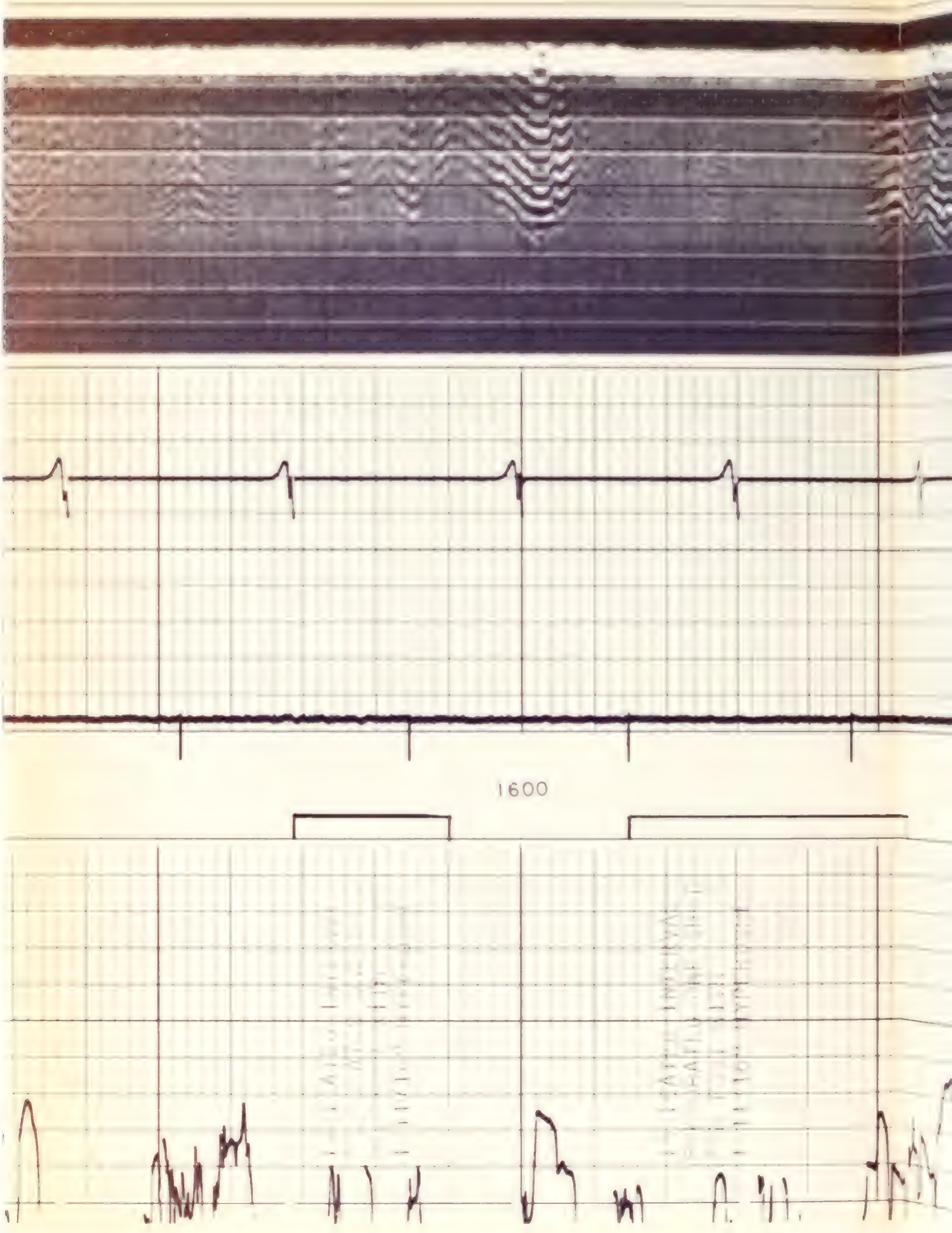

1000

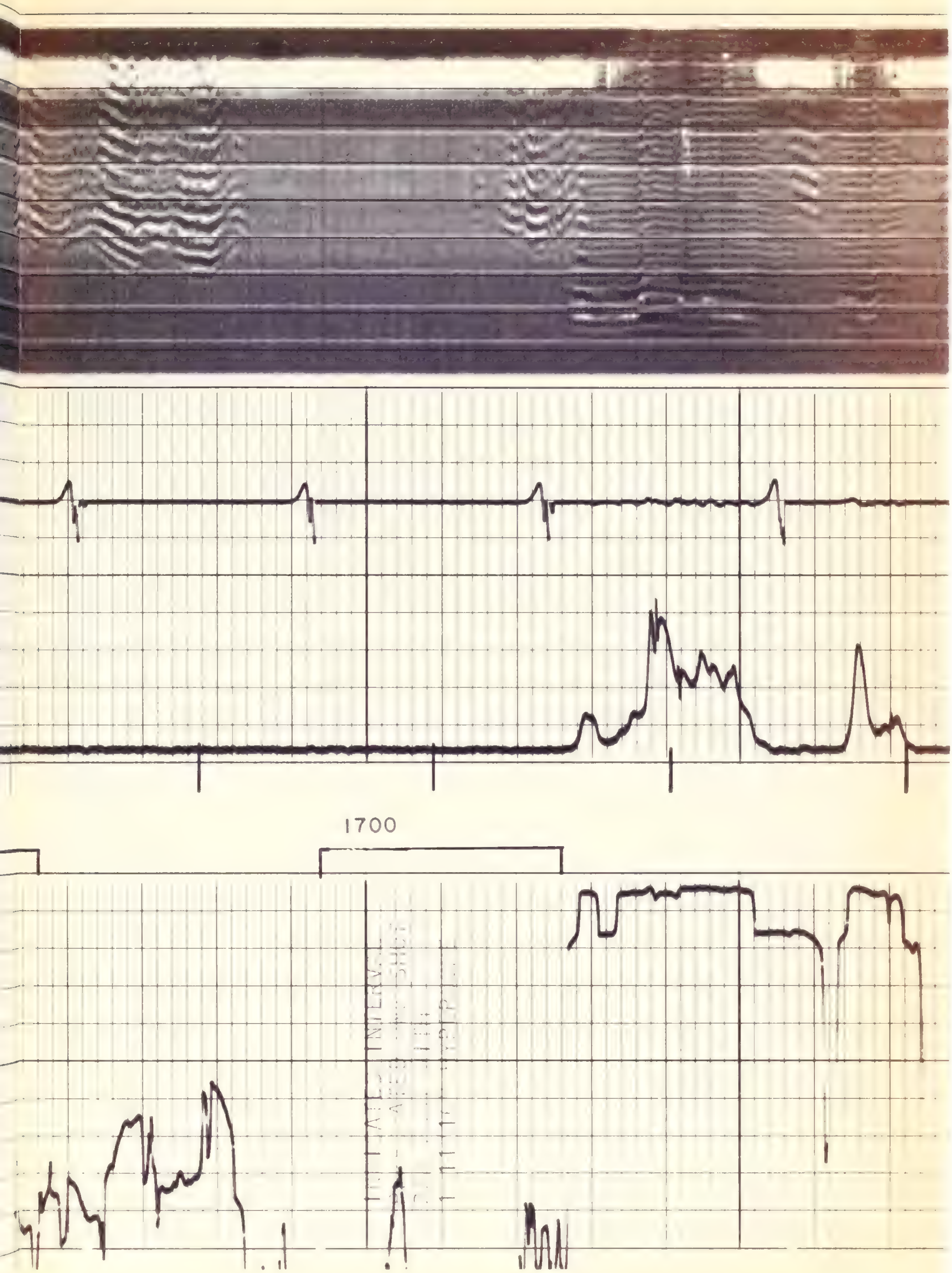

1100

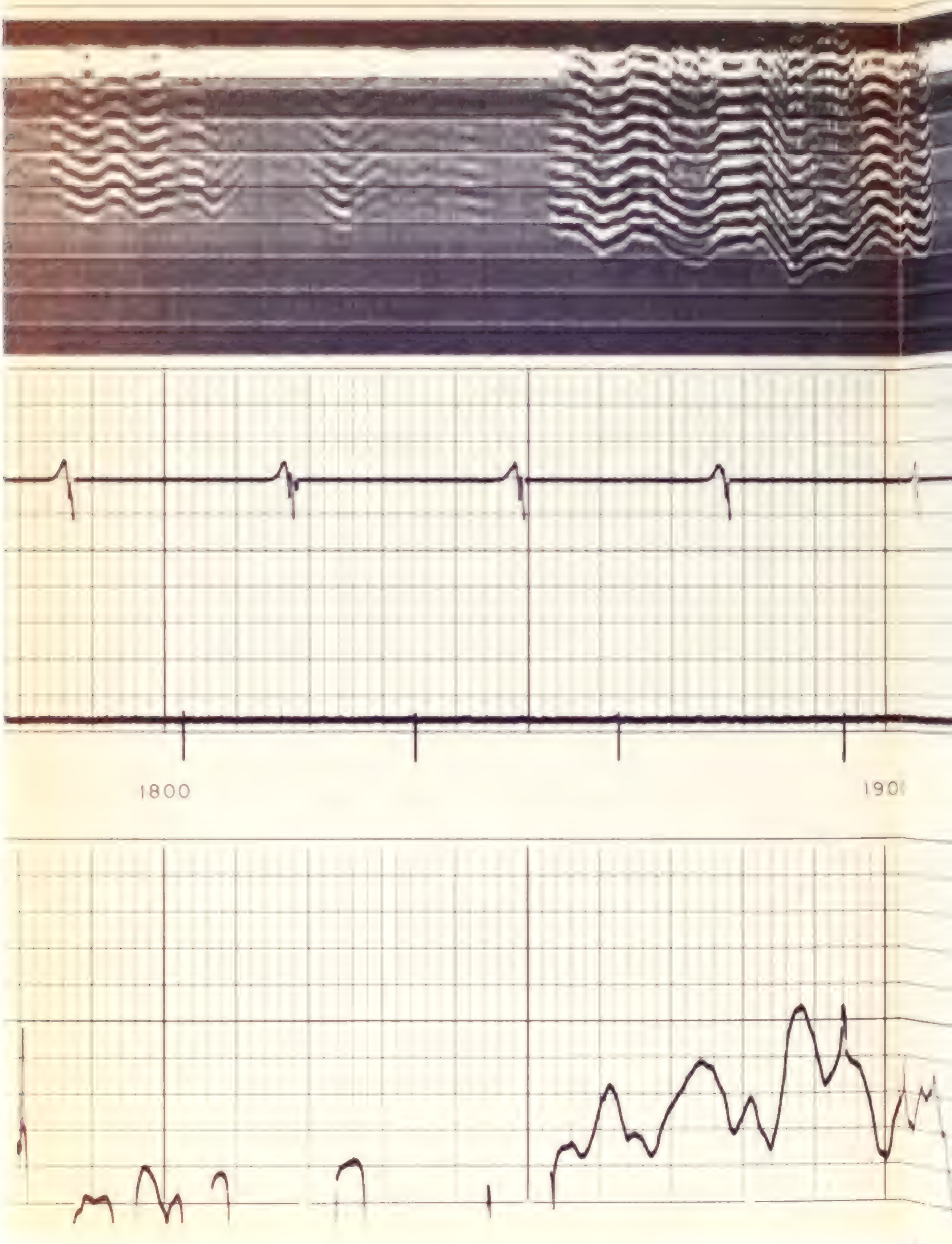

1200

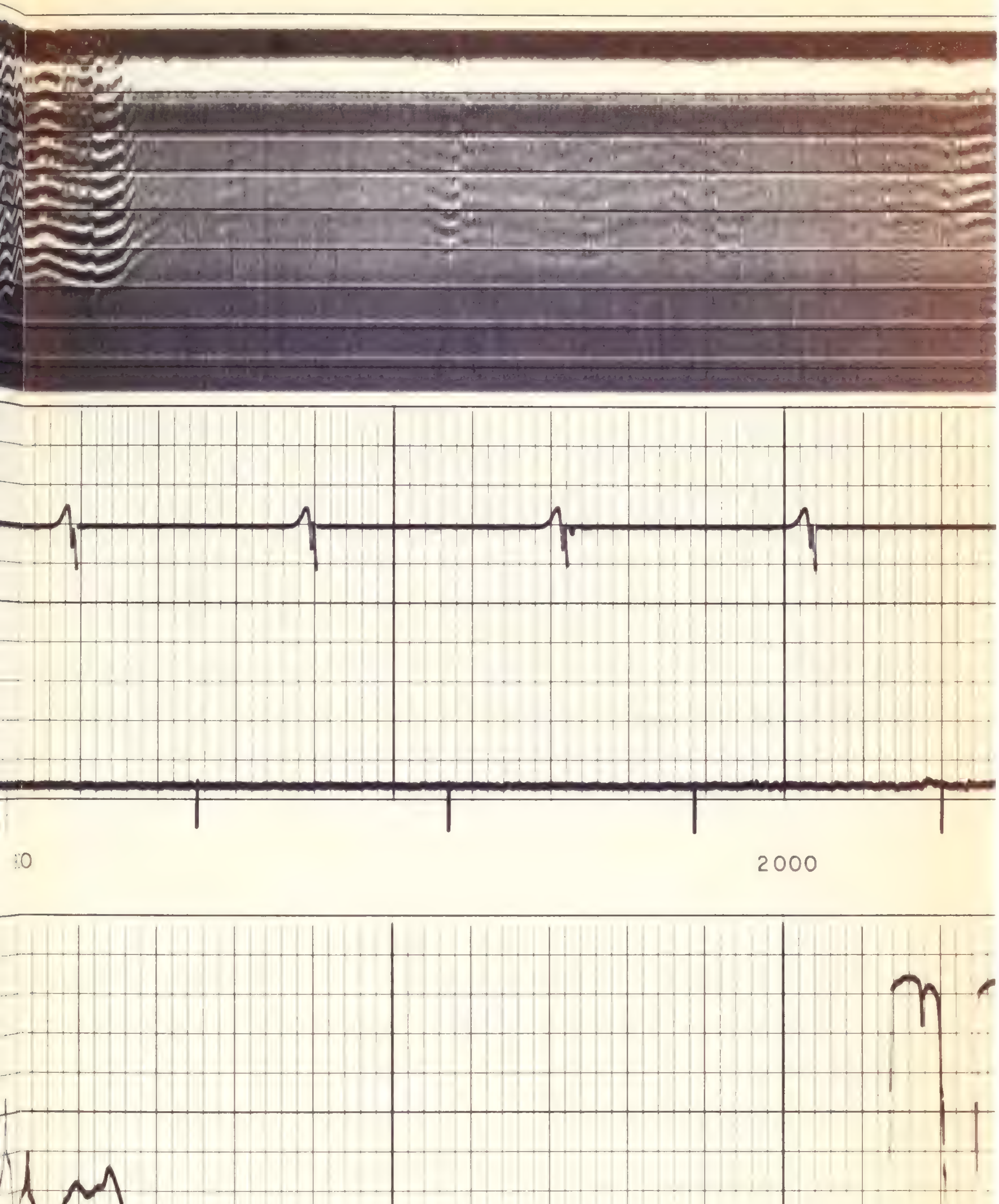

1300
1400

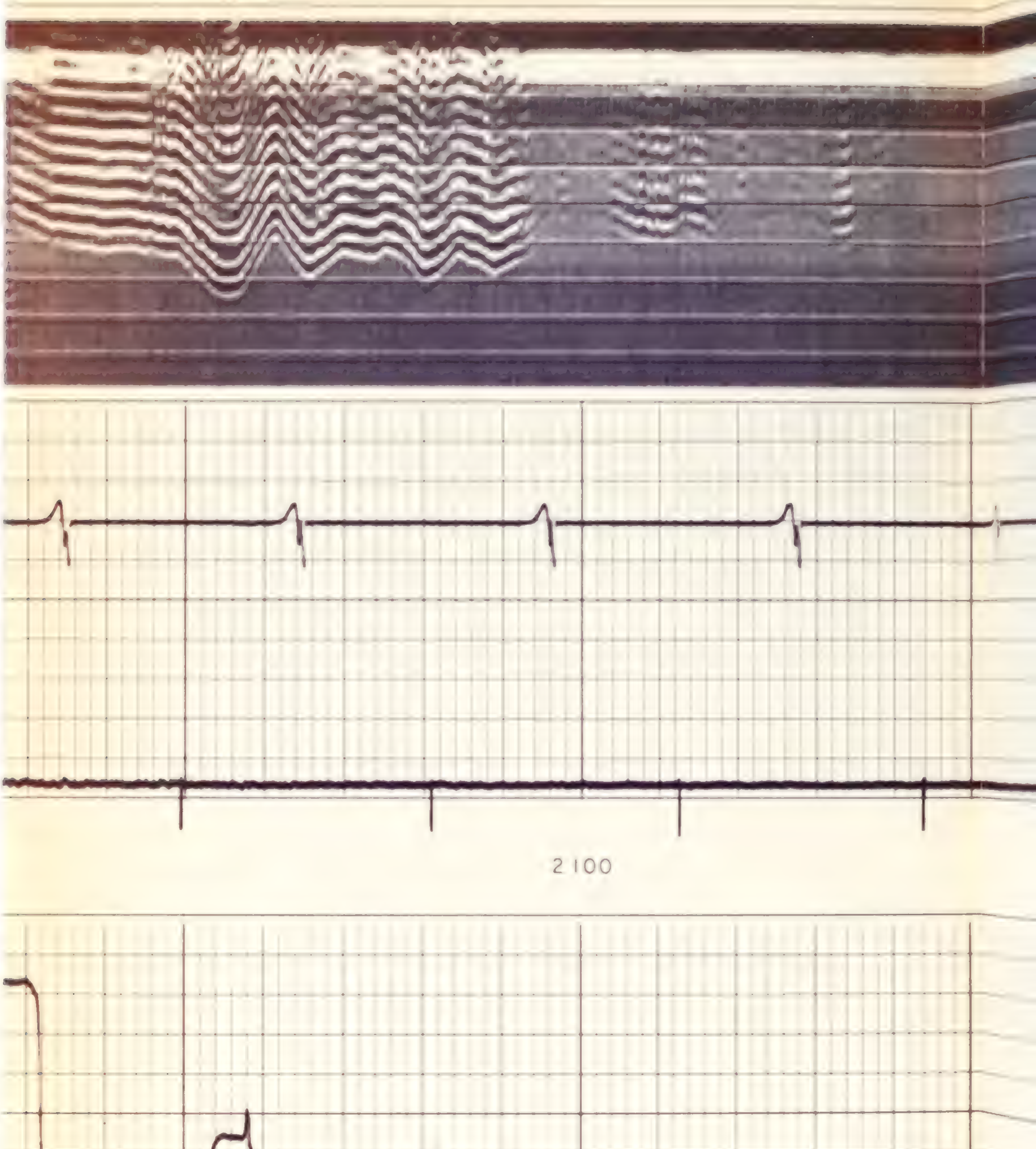

1500

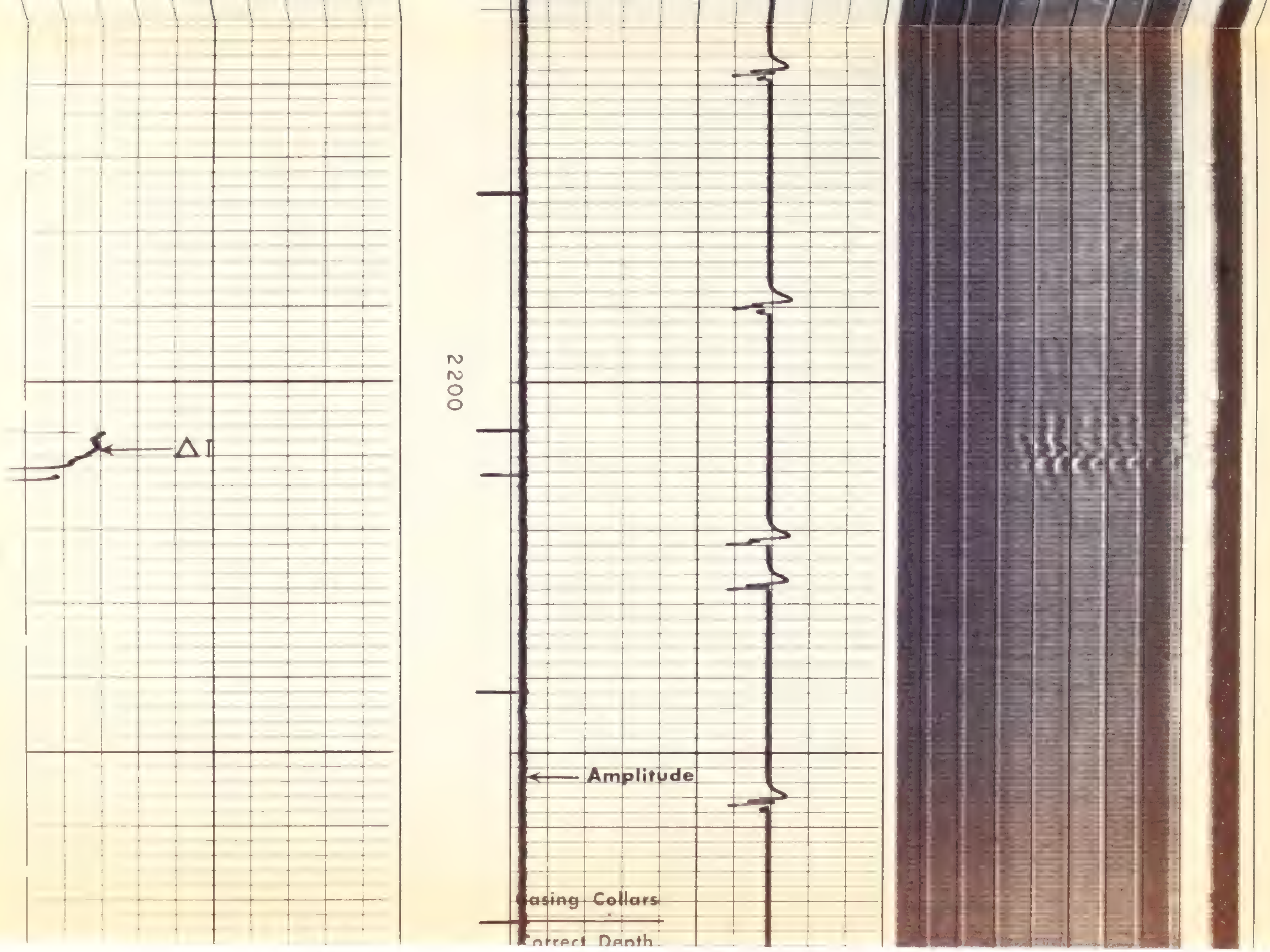

1600

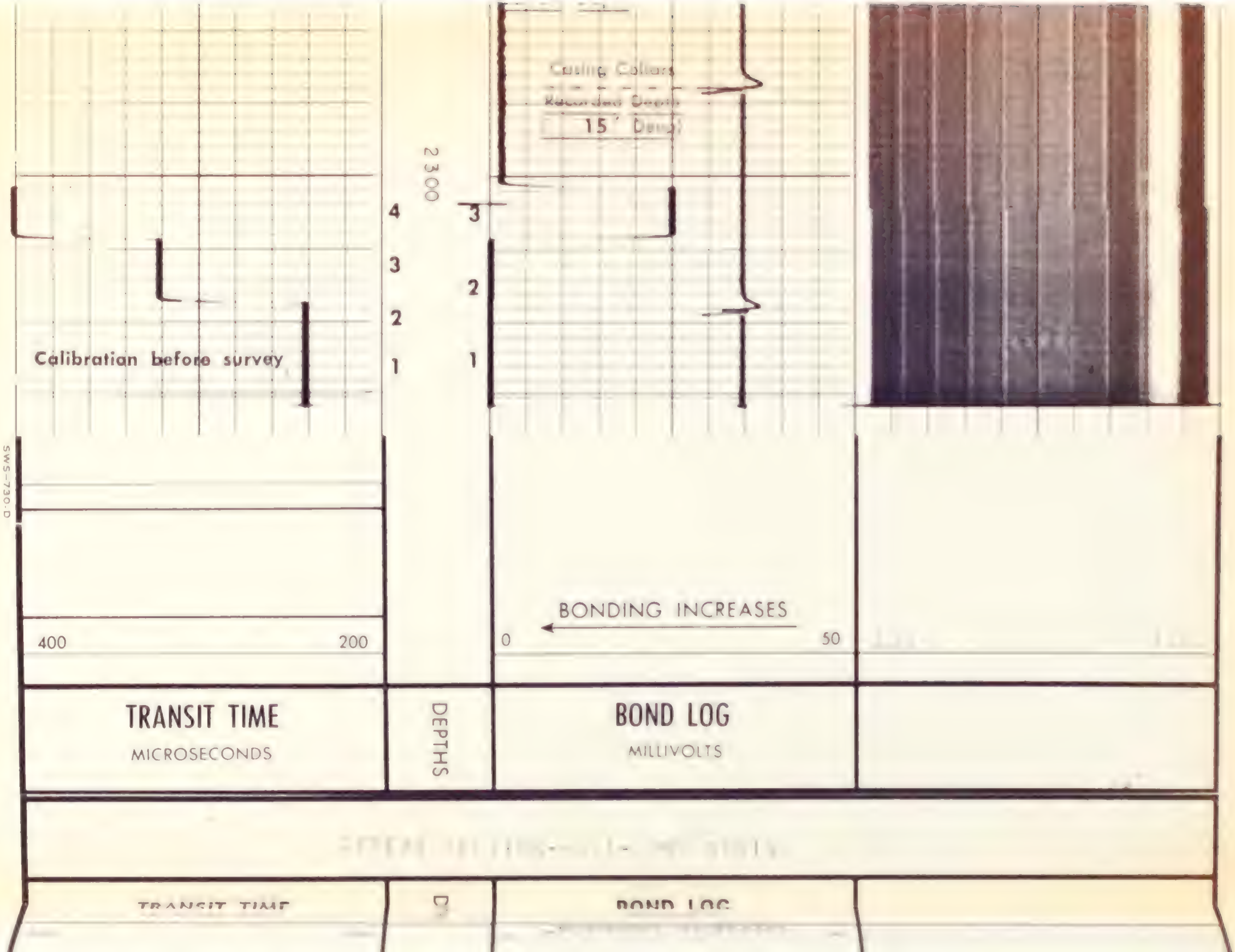

1700
INTERVAL

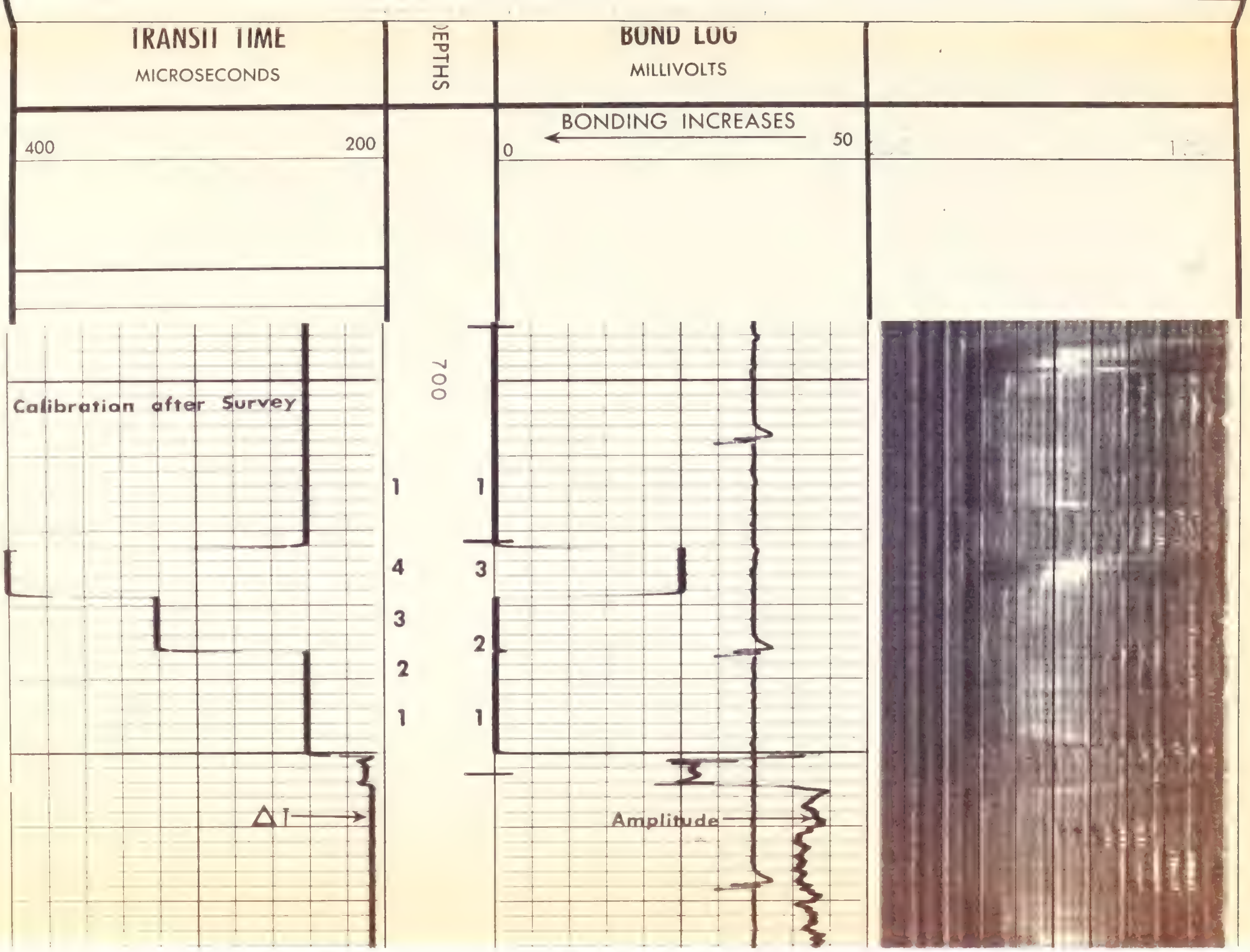

1800
1901

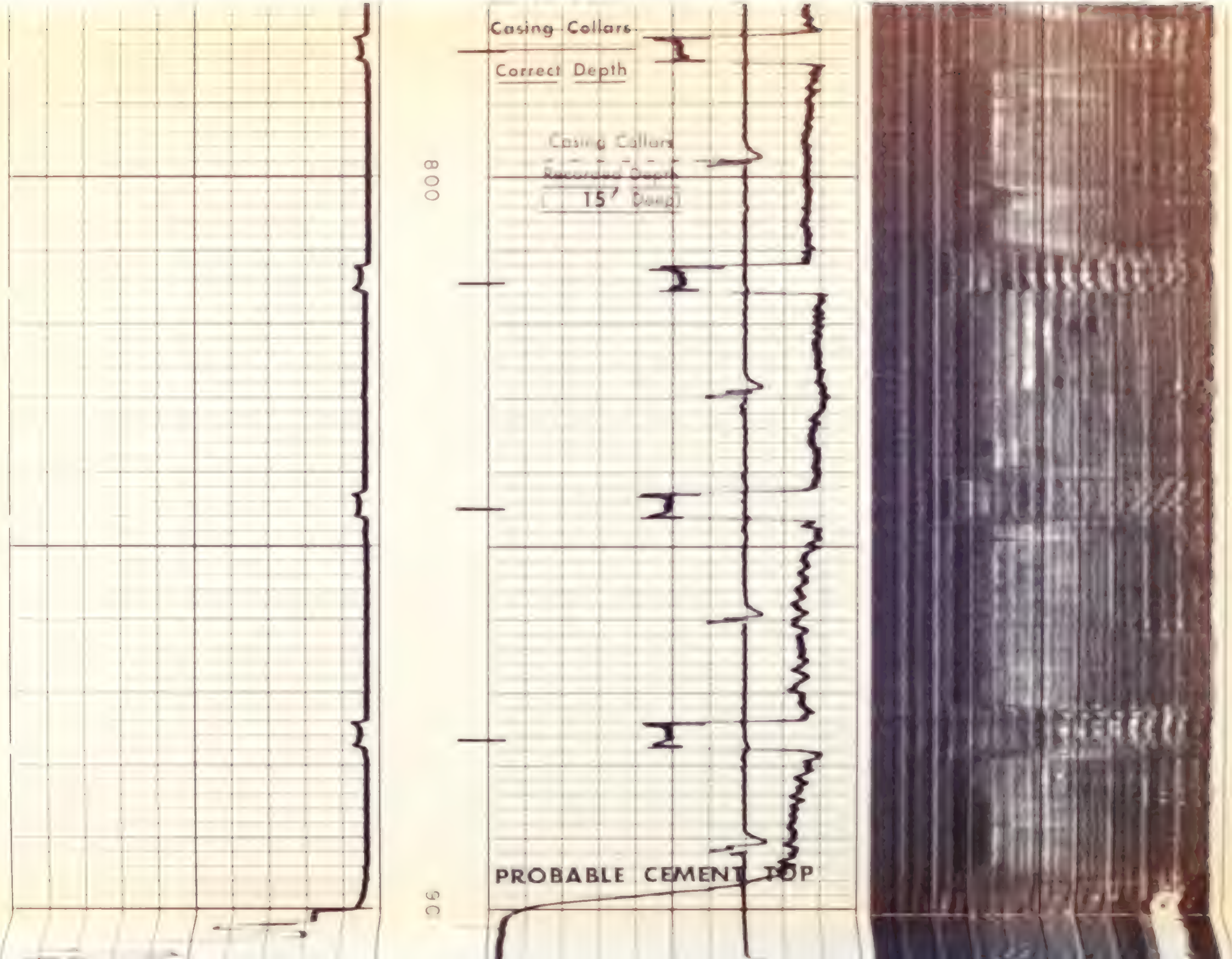

0
2000

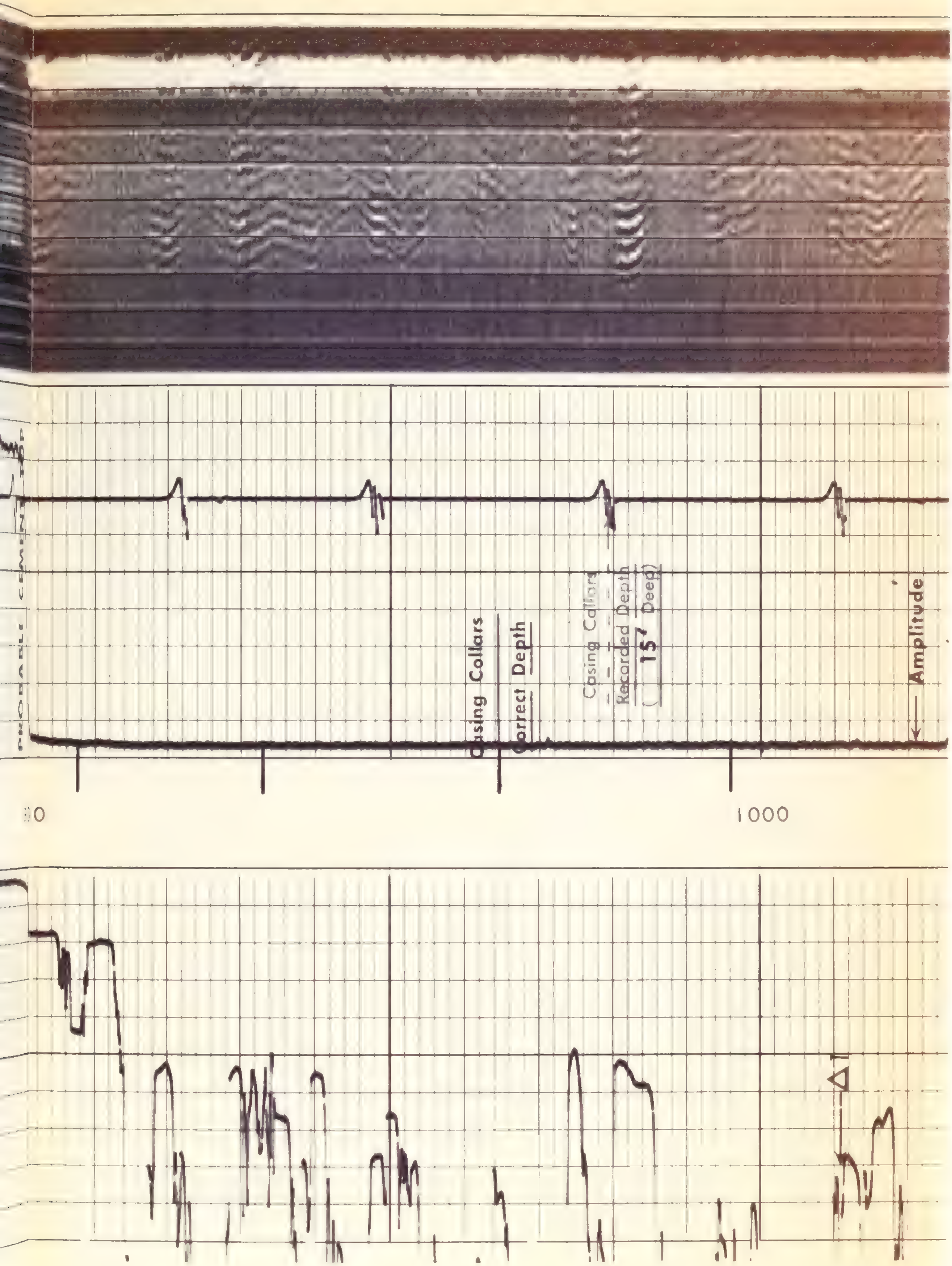

2 100

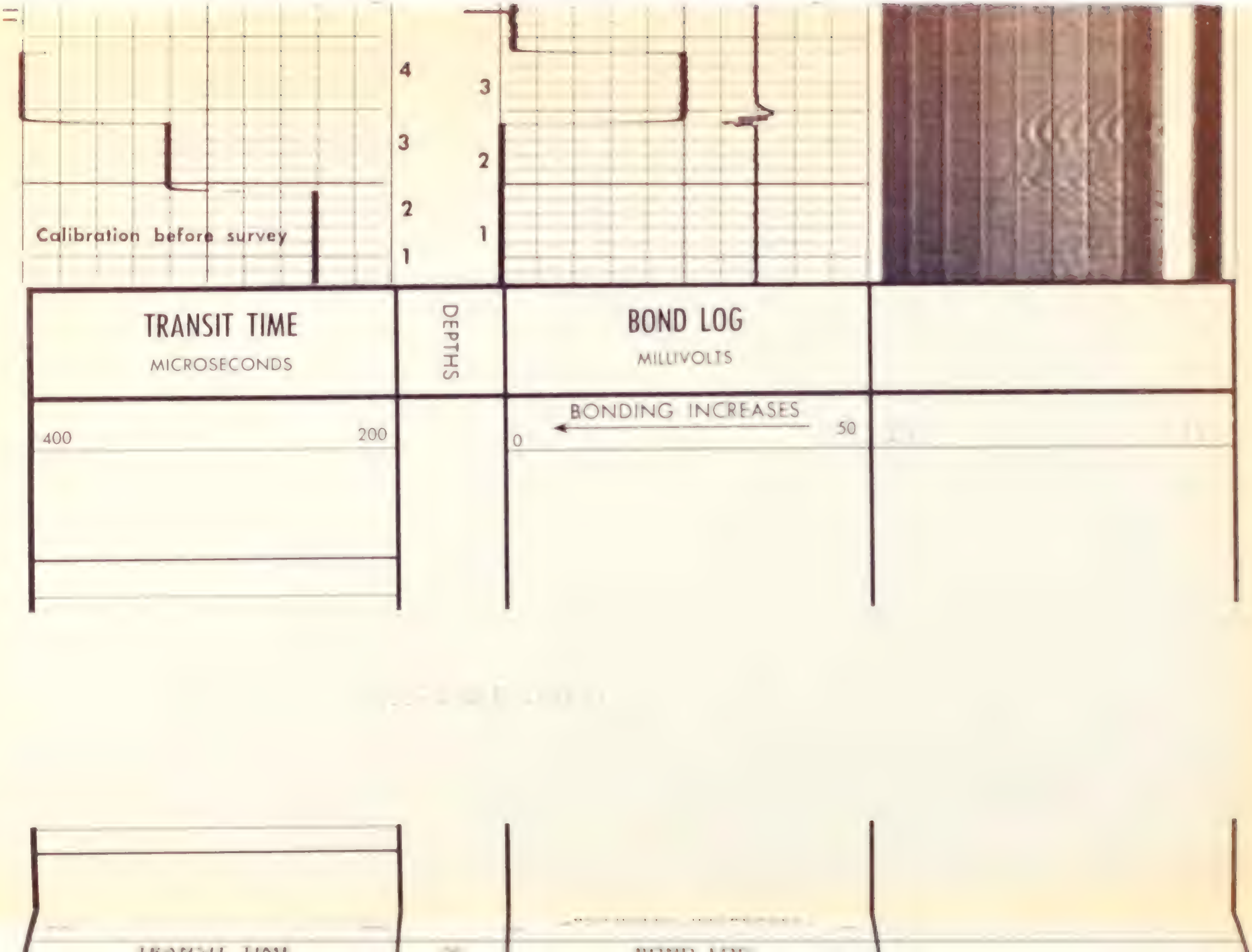

ΔT
2200
Amplitude
asing Collars
orrect Depth

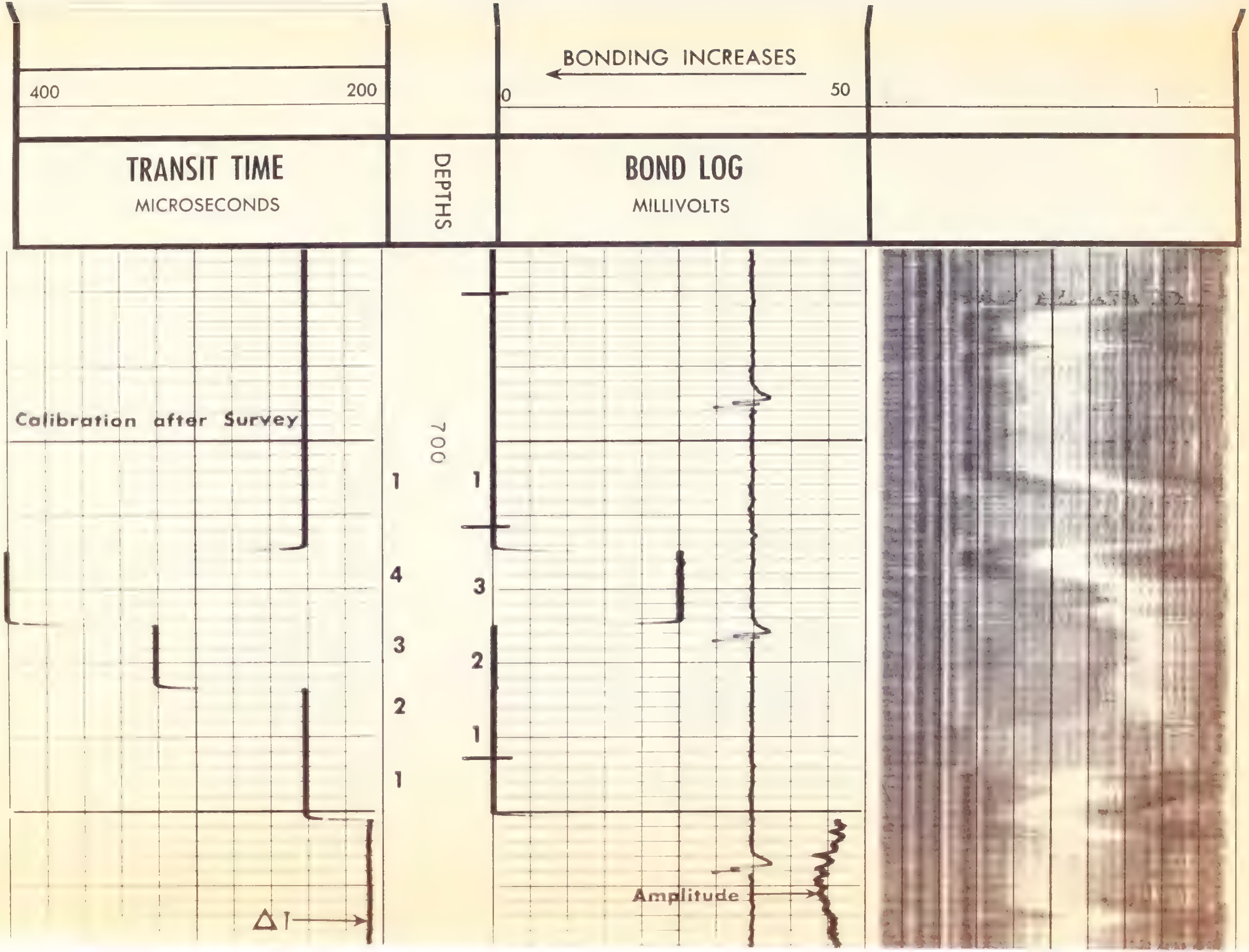

Casing Collars
Recorded Depth
15' Deep
Calibration before survey
2300
4
3
2
1
3
2
1
400
200
0
50
BONDING INCREASES
TRANSIT TIME
MICROSECONDS
DEPTHS
BOND LOG
MILLIVOLTS
SWS-730-D

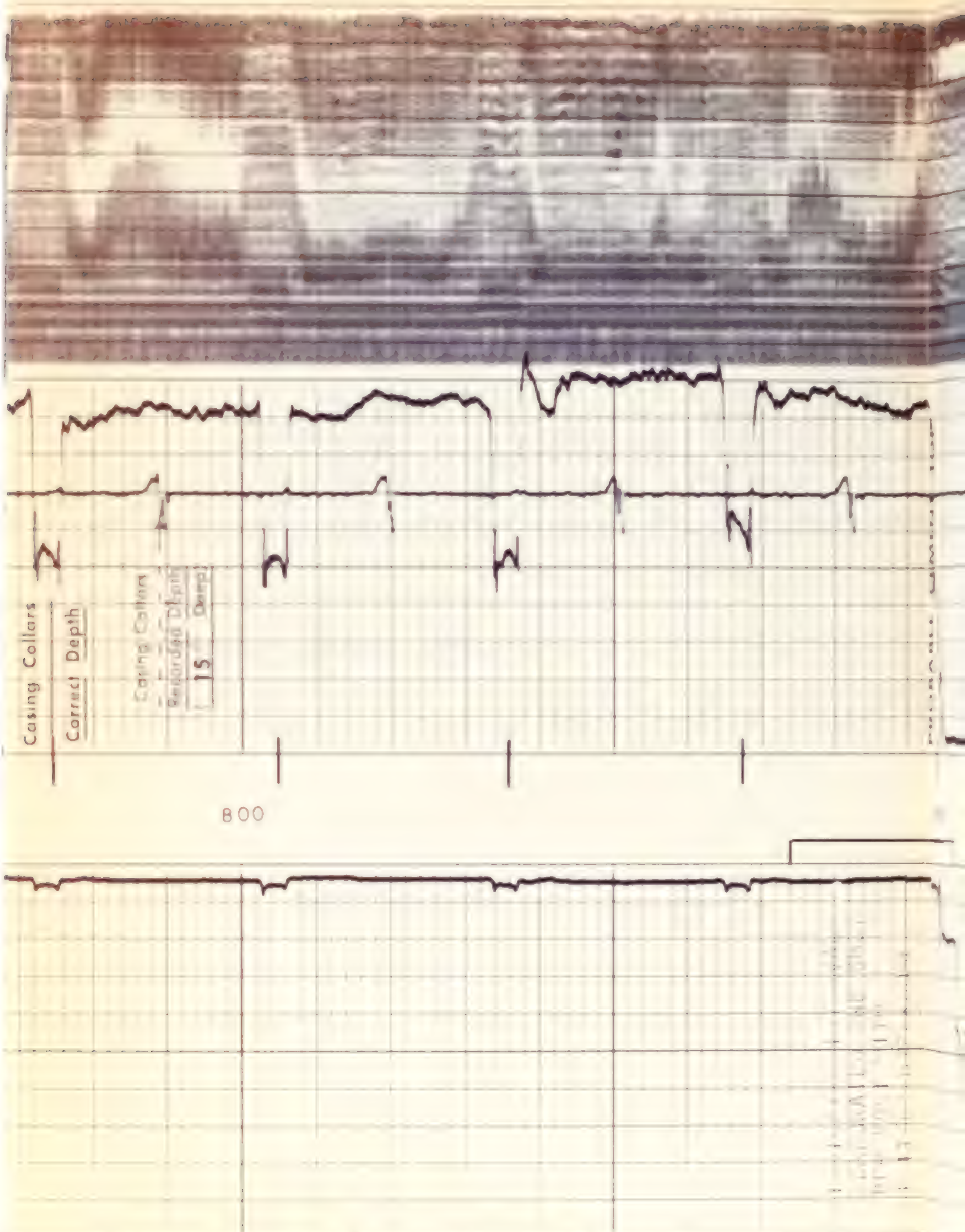

TRANSIT TIME
MICROSECONDS
400
200
DEPTHS
BOND LOG
MILLIVOLTS
BONDING INCREASES
0
50
700
Calibration after Survey
1
4
3
2
1
1
3
2
1
ΔT
Amplitude

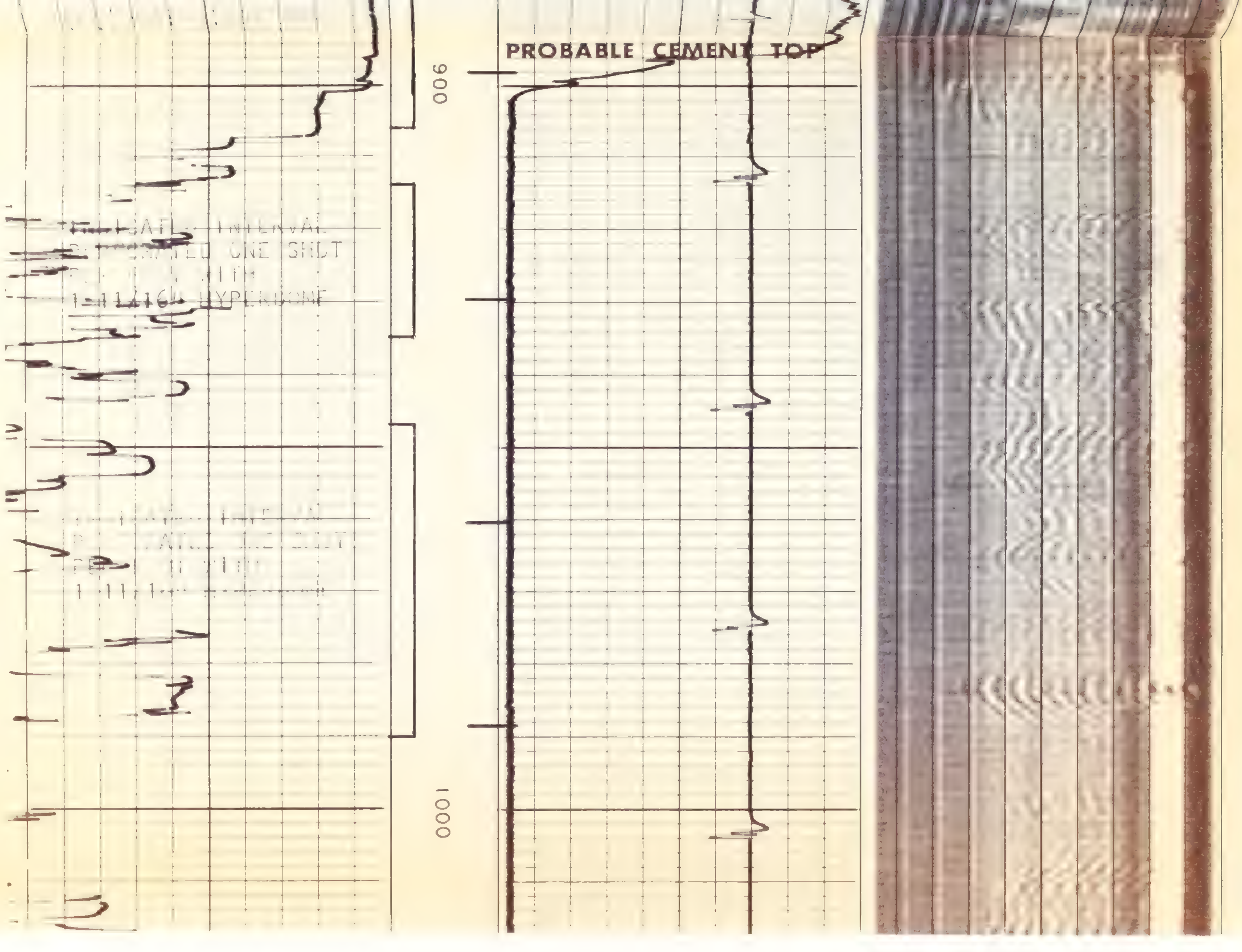

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
15' Deep
800
PROBABLE CEMENT TOP
90

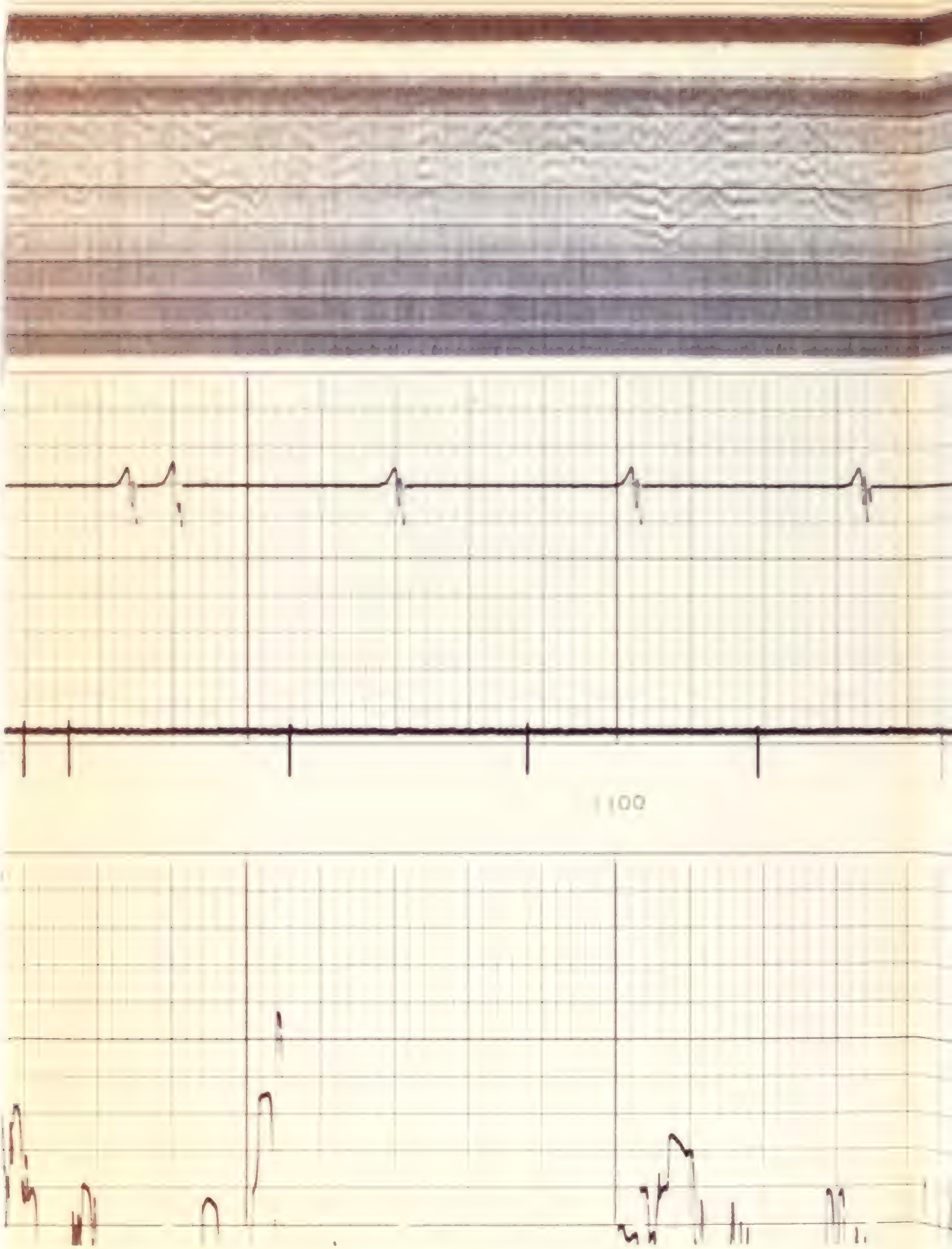

PROBABLE CEMENT TOP
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
1000
ΔT

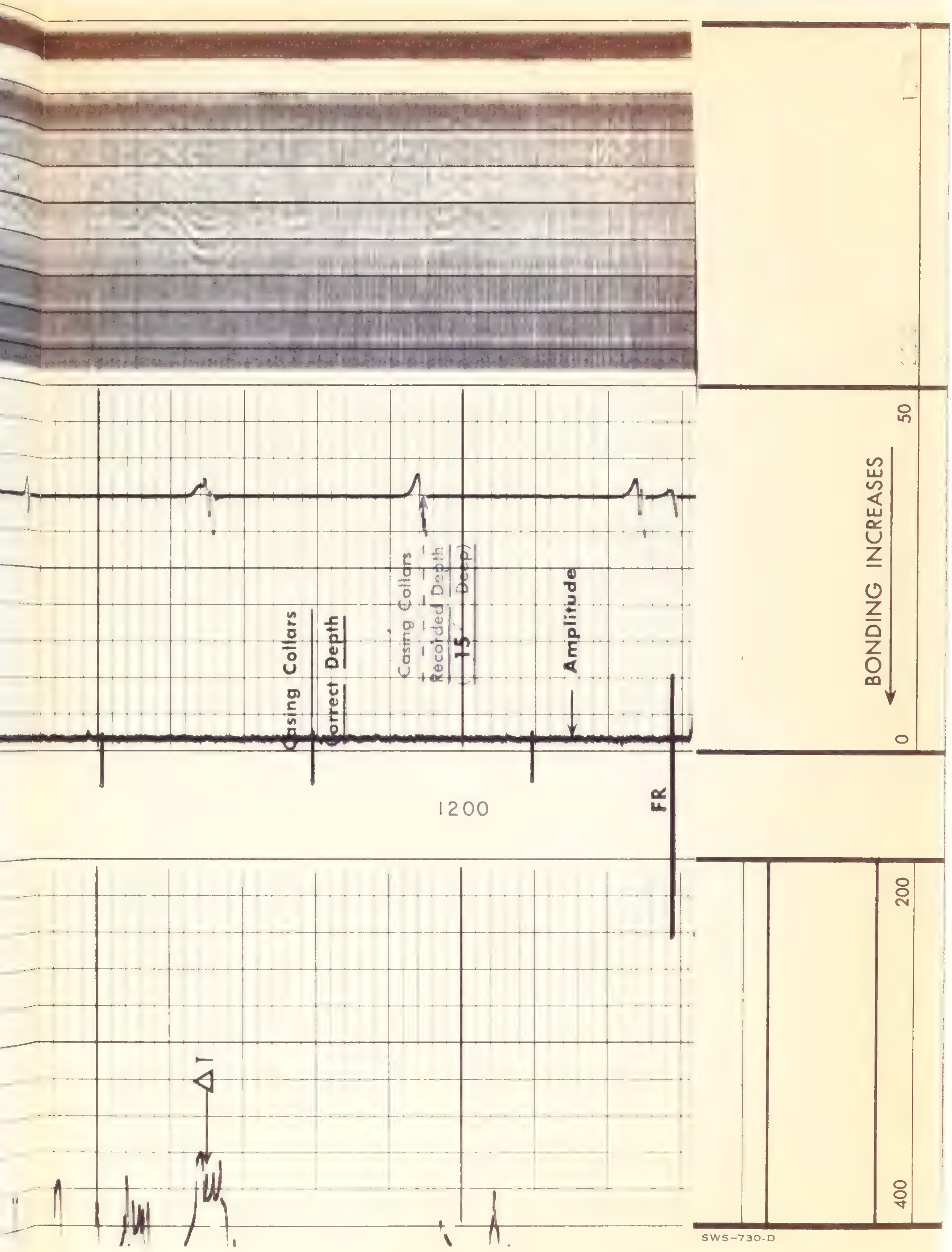

Calibration before survey
4
3
2
1
3
2
1
TRANSIT TIME
MICROSECONDS
DEPTHS
BOND LOG
MILLIVOLTS
BONDING INCREASES
400
200
0
50

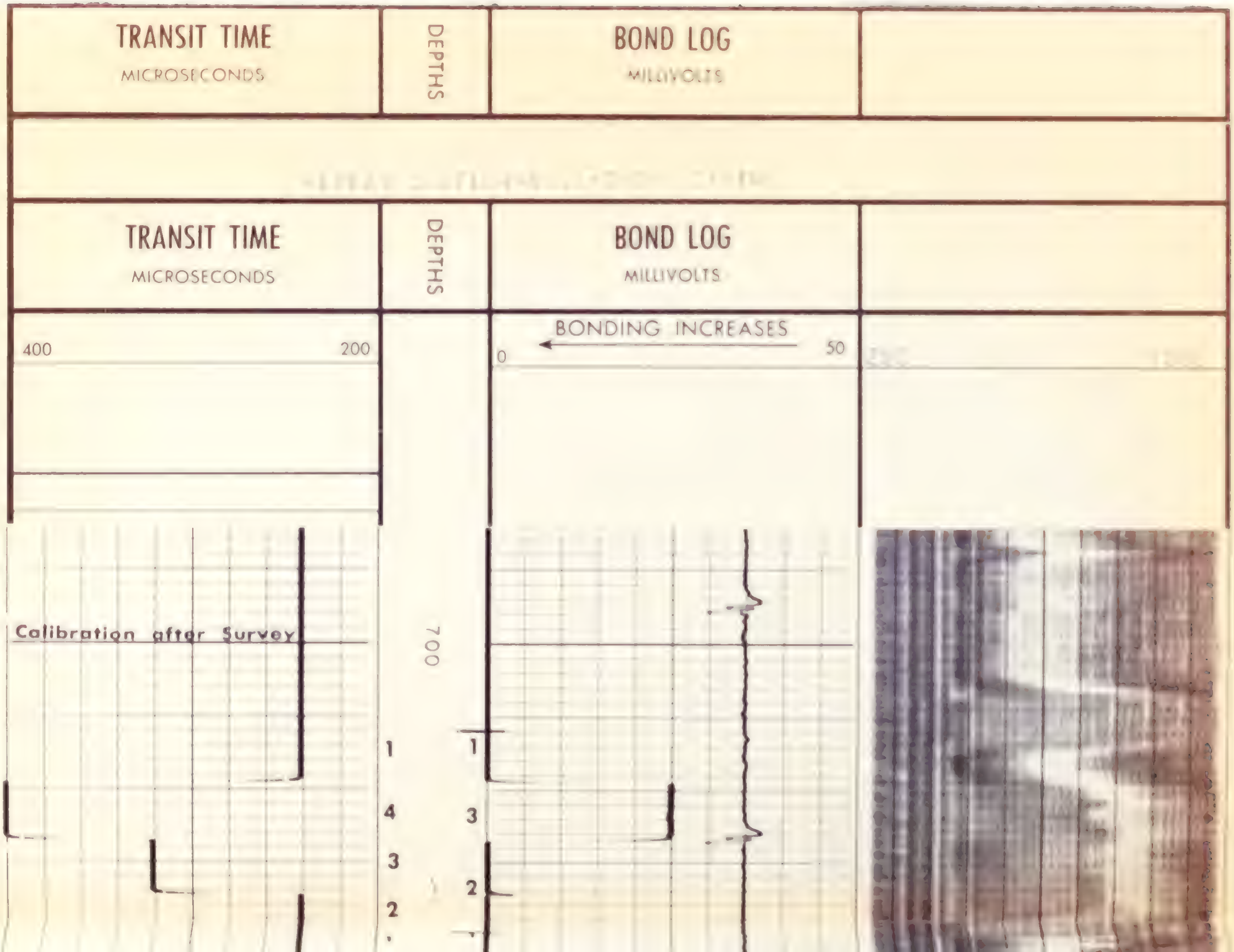

TRANSIT TIME
MICROSECONDS
400
200
DEPTHS
700
BOND LOG
MILLIVOLTS
BONDING INCREASES
0
50
1
Calibration after Survey
1
4
3
2
1
1
3
2
1
Amplitude
ΔT

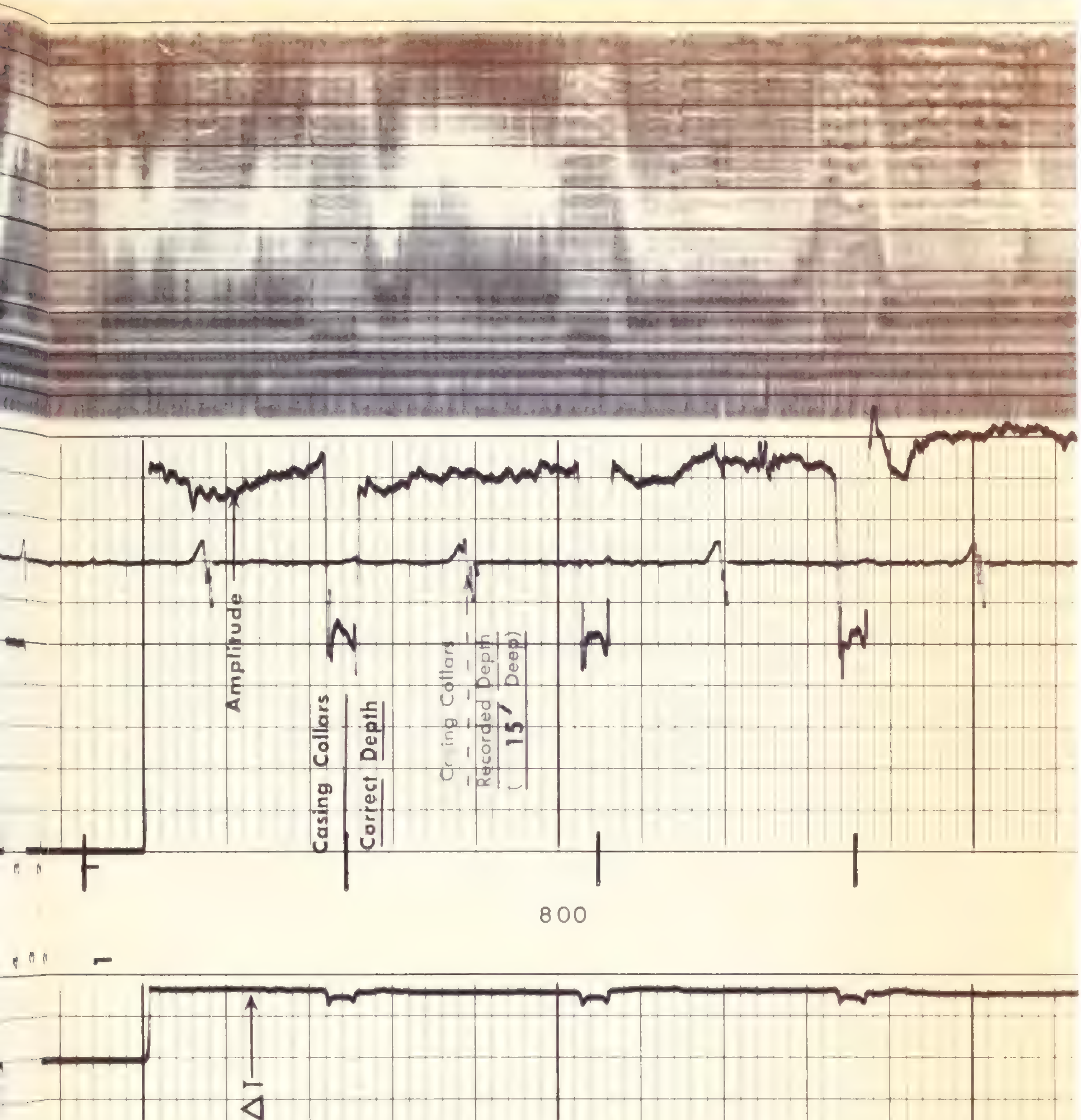

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
15
Damp
800

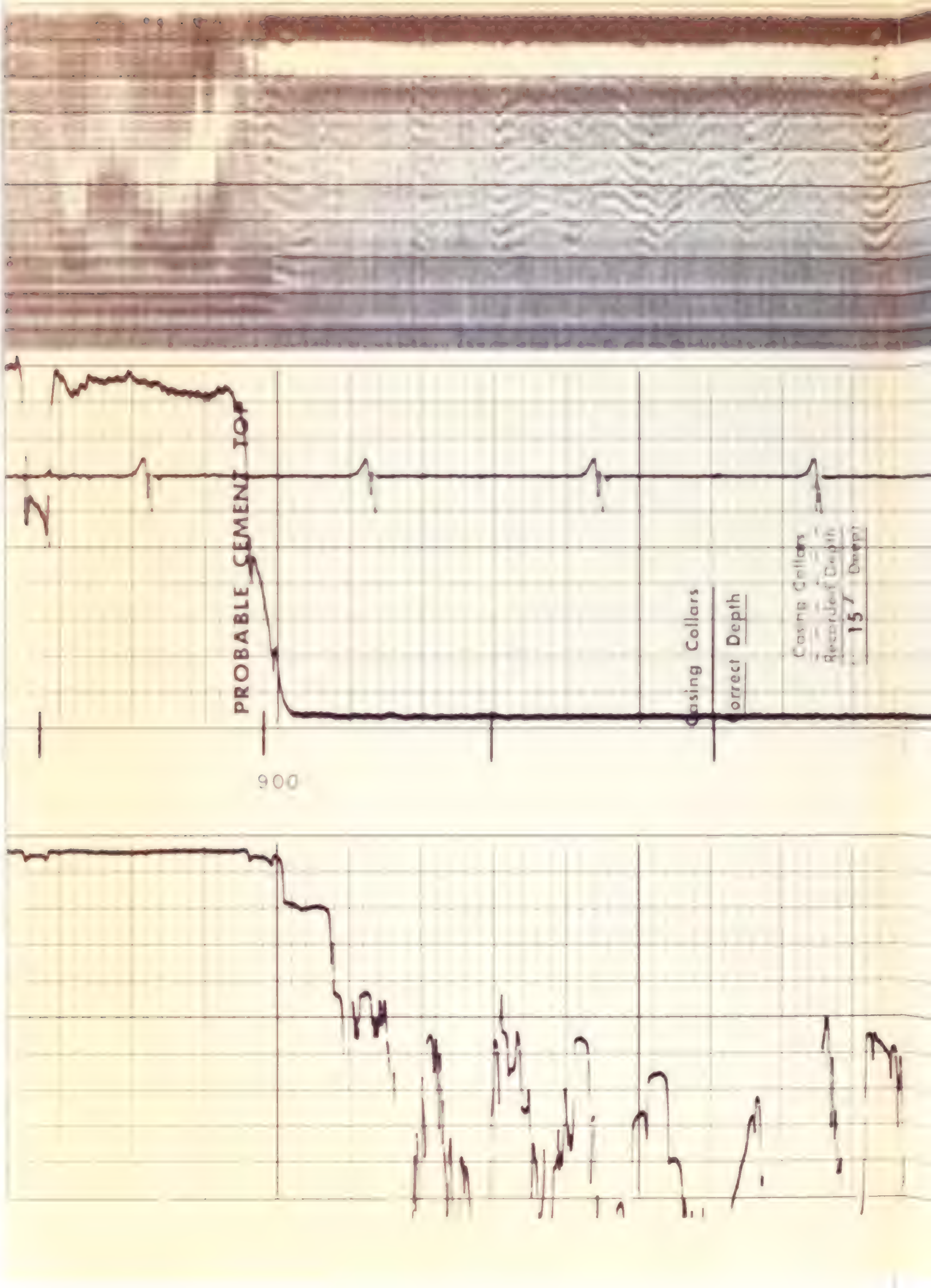

PROBABLE CEMENT TOP
900
1000
PERFORATED INTERVAL
PERFORATED ONE SHOT
P[illegible] WITH
1-11/16" HYPERDOME
[illegible] INTERVAL
PERFORATED ONE SHOT
PE[illegible] WITH
1-11/1[illegible]

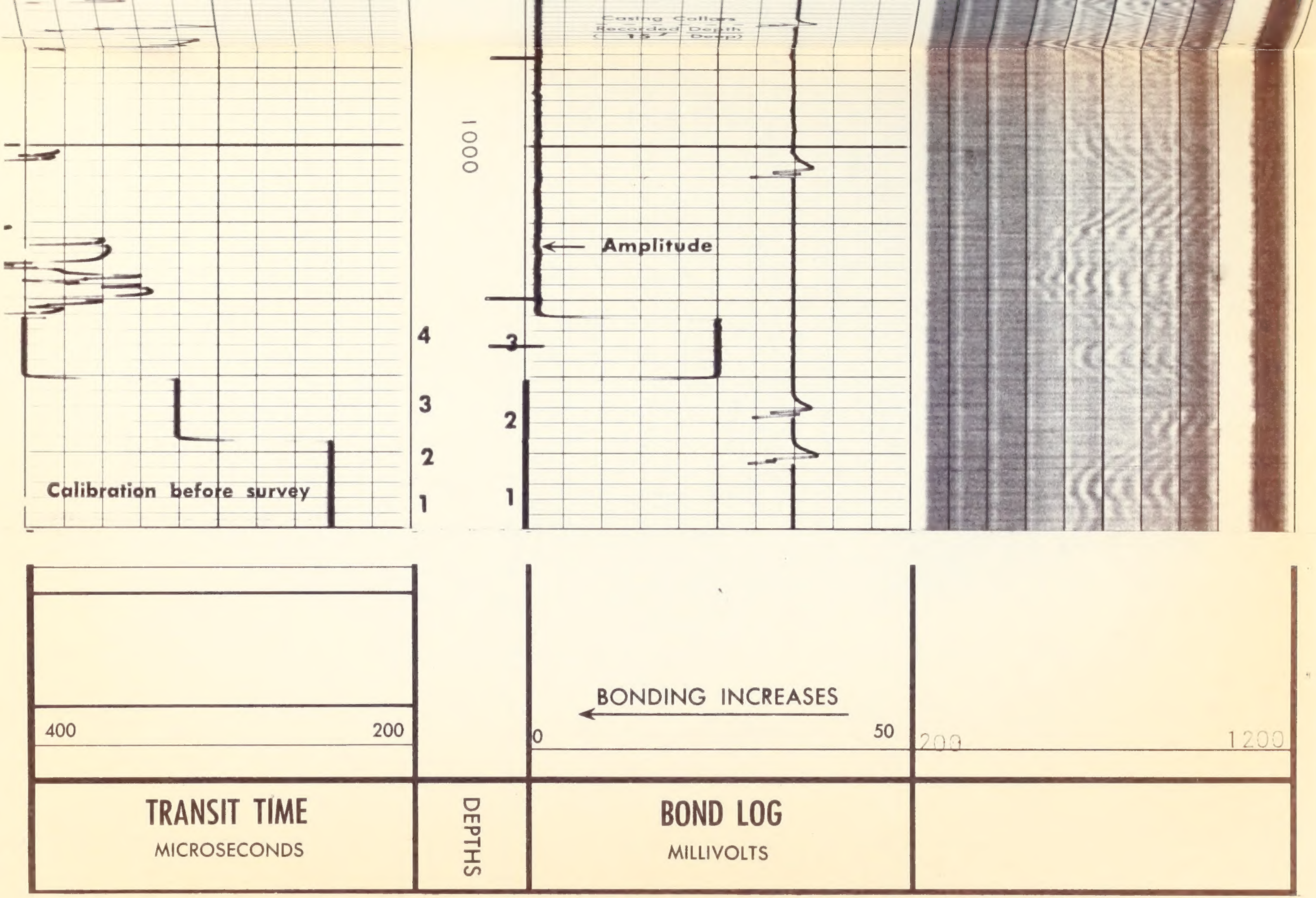

1100


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
FR
1200
BONDING INCREASES
0
50
200
400
ΔT
SWS-730-D

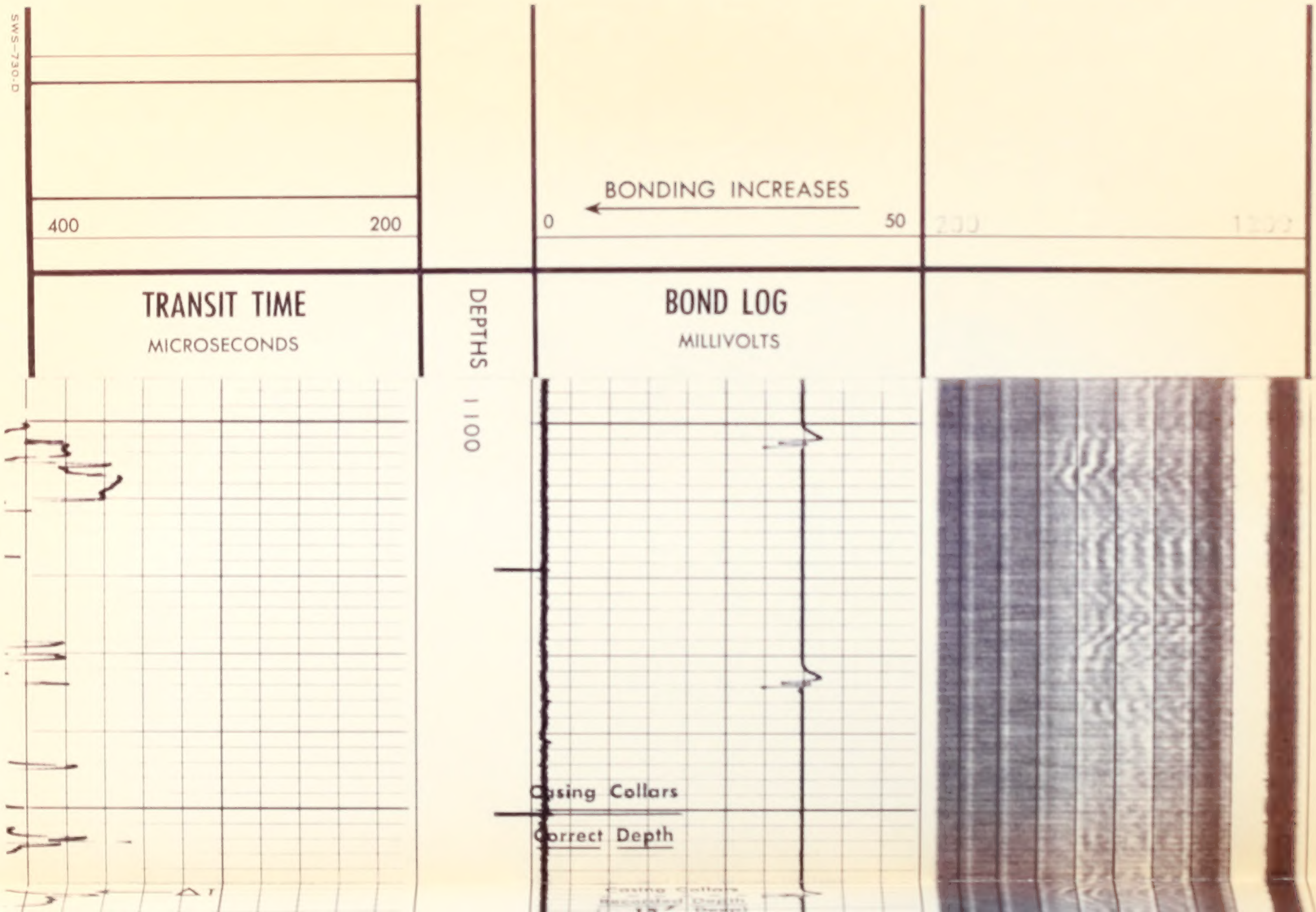

TRANSIT TIME
MICROSECONDS
DEPTHS
BOND LOG
MILLIVOLTS
TRANSIT TIME
MICROSECONDS
DEPTHS
BOND LOG
MILLIVOLTS
BONDING INCREASES
400
200
0
50
Calibration after Survey
700
1
4
3
2
1
3
2

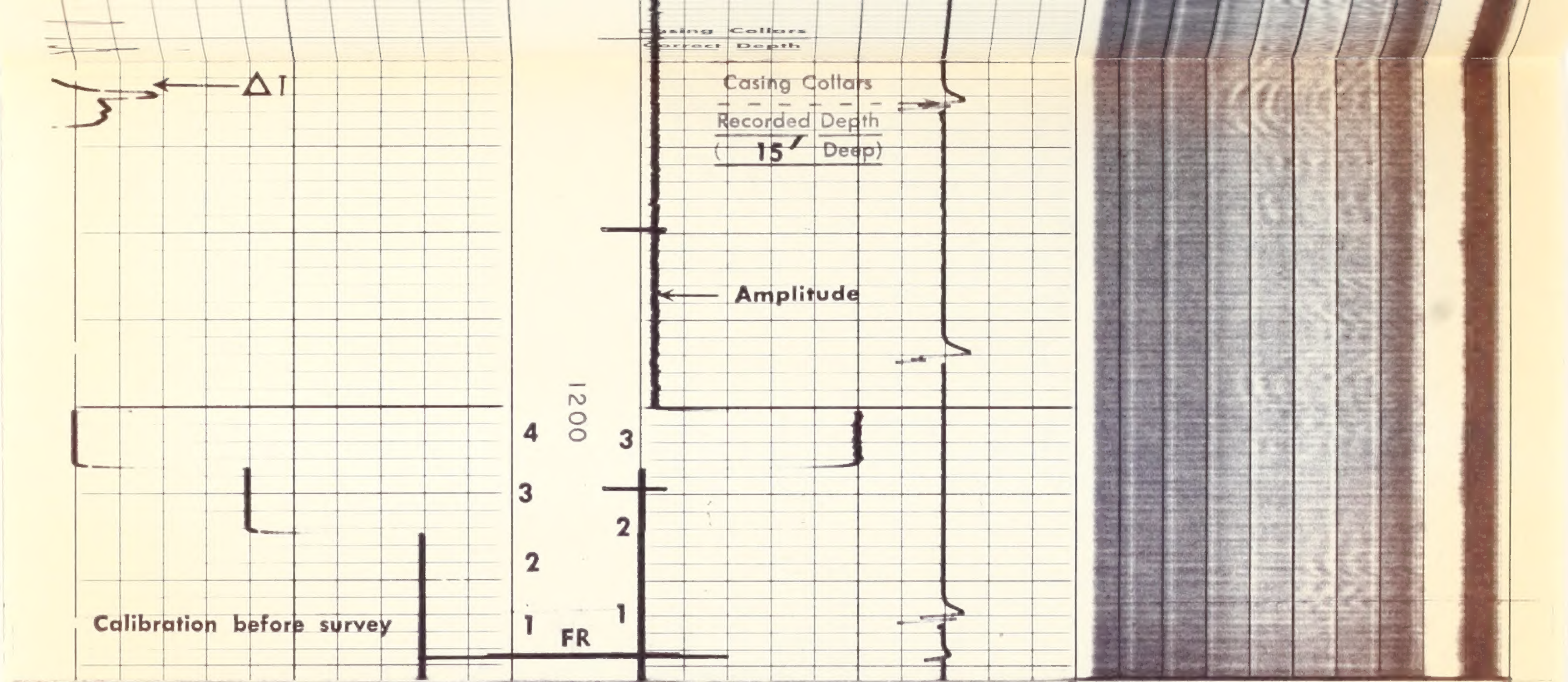

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
800
ΔT


PROBABLE CEMENT TOP
900
Casing Collars
orrect Depth
Casing Collars
Recorded Depth
15' Deeper



2-SHORT STRING-CALIBRATION RUN


SWS-730-D
400
200
TRANSIT TIME
MICROSECONDS
DEPTHS
1100
BONDING INCREASES
0
50
BOND LOG
MILLIVOLTS
Casing Collars
Correct Depth



Casing Collars
Corrected Depth

TRANSIT TIME	DEPTH	CASING BOND	VARIABLE DENSITY
MICROSECONDS 200 SPACING		MILLIVOLTS	MICROSECONDS 5 FT SPACING
400 200		0 50	200 1200

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO. 1

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR [illegible]
SCHL. TD ----/1240
DRLR TD 2510/1234
Elev:
KB ----
DF ----
GL 6428

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	